

COMPLEX TERRAIN

Megacities and the Changing Character of Urban Operations

Edited by Benjamin M. Jensen,
Henrik Breitenbauch, and Brandon Valeriano

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

complex terrain

COMPLEX TERRAIN

Megacities and the Changing Character of Urban Combat

Edited by
Benjamin M. Jensen, PhD
Henrik Breitenbauch, PhD
Brandon Valeriano, PhD

MCUP
MARINE CORPS UNIVERSITY PRESS
Quantico, Virginia
2019

Library of Congress Cataloging-in-Publication Data
Names: Jensen, Benjamin M., editor. | Breitenbauch, Henrik, editor. | Valeriano, Brandon, editor.
Title: Complex terrain : megacities and the changing character of urban combat / edited by Benjamin M. Jensen, PhD, Henrik Breitenbauch, PhD, Brandon Valeriano, PhD.
Other titles: Megacities and the changing character of urban combat
Description: Quantico, VA : Marine Corps University Press, 2019. | Includes index. | Summary: "This book explores military operations, including indirect support to other interagency actors and functions in dense urban terrain and megacities. Dense urban terrain describes urban areas with high population densities that, in the developing world, often outstrip the capacity of local governance systems to exert formal control. The term megacity describes a city with a population of 10 million or more. These environments define patterns of human settlement. In 1950, only 30 percent of the world's population lived in cities compared to more than 55 percent in 2018. Much of this growth is concentrated in large, urban centers that connect a global flow of goods and ideas. By 2030, there will be more than 40 of these megacities"-- Provided by publisher.
Identifiers: LCCN 2019028784 | ISBN 9780160954344 (paperback)
Subjects: LCSH: Urban warfare. | Urban warfare--History--21st century--Case studies. | Metropolitan areas--Strategic aspects. | Cities and towns--Growth--Strategic aspects. | Integrated operations (Military science)
Classification: LCC U167.5.S7 C66 2019 | DDC 355.4/26--dc23
LC record available at https://lccn.loc.gov/2019028784

Disclaimer

The views expressed in this publication are solely those of the authors. They do not necessarily reflect the opinions of the organizations for which they work, Marine Corps University, the U.S. Marine Corps, the Department of the Navy, or the U.S. government. The information contained in this book was accurate at the time of printing. Every effort has been made to secure copyright permission on excerpts and artworks reproduced in this volume. Please contact the editors to rectify inadvertent errors or omissions.

The production of this book and other MCUP products graciously supported by the Marine Corps University Foundation.

Published by
Marine Corps University Press
2044 Broadway Drive
Quantico, VA 22134
www.mcu.usmcu.edu/mcupress

1st Printing, 2019

For sale by the Superintendent of Documents, U.S. Government Publishing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512-1800; DC area (202) 512-1800
Fax: (202) 512-2104 Mail: Stop IDCC, Washington, DC 20402-0001

ISBN 978-0-16-095434-4

CONTENTS

List of Illustrations ix
Foreword xi

Introduction 3
Henrik Breitenbauch, PhD, and Benjamin Jensen, PhD

CHAPTER ONE 11
Third World Megacities:
An Illusion of Control
Lieutenant Commander Muhammad Maooz Akrama, Pakistan Marines

CHAPTER TWO 52
Territorialization of the Megacity:
Exploiting Social Borders
Major Alexandra V. Gerbracht, U.S. Marine Corps

CHAPTER THREE 75
The 2008 Battle of Sadr City:
Implications for Future Urban Combat
David E. Johnson and M. Wade Markel

CHAPTER FOUR 93
ISIL's Territorial Logic of Urban Control in Mosul and ar-Raqqah:
City as a System Analytical Framework
Erin M. Simpson, PhD

CHAPTER FIVE 111
Distributed Influence:
Enabling Maneuver in a Megacity
Major Jonathon T. Frerichs, U.S. Marine Corps

CHAPTER SIX 140
Coordinating Chaos: Integrating Capabilities
in Future Urban Conflict
Major Robert D. Barbaree III, U.S. Marine Corps

CHAPTER SEVEN 156
Joint Combined Arms Maneuver in the Megacity:
Learning to Thrive in Chaos
Major Geoffrey B. Lynch, U.S. Army

CHAPTER EIGHT 181
Cyberspace in the Megacity:
Thickening the Fog of War?
Major Joseph I. Farina, U.S. Marine Corps

CHAPTER NINE 212
Take It, Don't Break It:
A Megacity Concept of Operations
Colleen Borley, Foreign Service Officer, Department of State

CHAPTER TEN 234
Symbiotic Warfare:
Resource Competition and Conflict
Major Christina L. Manning, U.S. Air Force

CHAPTER ELEVEN 263
Air Domain Dominance in a Megacity
Major Nathan J. Storm, U.S. Marine Corps

CHAPTER TWELVE 291
Virtual Resistance Networks:
Enabling and Protecting Electronic Information Flows
in the Megacity
Colin R. Relihan

CHAPTER THIRTEEN 311
The City Prism:
A Triangle of Urban Military Operations
Henrik Breitenbauch, Mark Winther, and Mikkel Broen Jakobsen

CONCLUSION
The Military Implications of Complex Terrain 344
in Twenty-first Century Urban Areas
Benjamin Jensen, PhD

Appendix: The World's Largest Megacities 361
Glossary of Select Terms, Abbreviations, and Acronyms 367
Index 371

ILLUSTRATIONS

Figure 1.1	Organization chart of Pakistan's central government	36
Figure 1.2	Notional operation plan phases	47
Figure 2.1	Collective behavior	56
Figure 2.2	1972 Figueroa Street gang map	65
Figure 3.1	The Baghdad International Zone and Sadr City	83
Figure 4.1	Reinforcing loop dependent on the flow of military supplies and fighters	97
Figure 4.2	Reinforcing loop of base raiding in ISIL's military structure and logistics	98
Figure 4.3	Major movements of ISIL personnel and captured weapons in vicinity of ar-Raqqah, 2014–15	99
Figure 4.4	Economic system of ISIL	104
Figure 10.1	Intraspecific competition with opportunity and risk	247
Figure 13.1	The ideal operation	321
Figure 13.2	Combat operations	323
Figure 13.3	Special operations	326
Figure 13.4	Peace operations	332
Figure 13.5	Stability operations	338

FOREWORD

The profession of arms is the most physically and intellectually demanding profession that exists today. The main reason for this is that we rarely get the opportunity to actually practice our profession, but we need to be ready in an instant to do so. When you combine these challenges with the realization that we are not good at predicting where the next fight will occur, or the character of that fight, it makes for a pretty steep learning curve, all while we and the people we lead are in harm's way. This is a very daunting proposition and the only reasonable response is to continuously study our profession as closely as possible, with particular attention to the changing character of warfare. This situation is directly related to technological changes, and as we have all seen, the pace of those changes has increased dramatically. The price of falling behind or ignoring key aspects of the changing character of warfare can be as dramatic as the British experience at the Battle of the Somme on 1 July 1916. Because they did not adequately understand the combined impact of the technological changes that developed prior to World War I, they had the worst day in the history of the British armed forces after suffering almost 60,000 casualties, with close to 20,000 of them killed on the first day of the battle.

The key to success in the profession of arms is continuously honing judgment through warfighting, training, and education. Warfighting refers to the conduct of war against thinking adversaries who counter your moves and decisions, as well as incorporating all the things we anticipate we will have to deal with in the future operating environment. Training prepares us for those things we know we will have to do in combat and to develop instinctive reactions to enable surviving first contact so that we can accomplish the mission. Education prepares us for what happens next, which is always unknown.

When you combine the three elements, you ensure that you have competent, confident forces who can recognize what is happening in short order and then deal with anything that is thrown at them. While we know we are challenged in predicting the next fight, Sir Michael E. Howard reminds us that we should always seek to be not too far off the target, but rather have the mental agility to adapt quickly once we get into that fight.[1]

This volume represents an effort by military professionals to meet the aforementioned challenges and provide solutions to these challenges. It is an effort to understand the changing nature of urban conflict in particular, because many of the trends we are seeing now indicate that the potential for this to be our next battlefield increases every year. When you consider that the majority of the world's population now lives in cities and the trend continues upward, it does not take much imagination to understand that urban centers will continue to be an increasing source of unrest and conflict. When you also add the consideration that many militaries around the world realize how complex and difficult urban fighting is, it is no wonder that Saddam Hussein was advised in 2003 to concentrate his forces in major urban centers to draw us into protracted and bloody fighting, which would also counter many of our technological strengths. He could win by outlasting us. Fortunately for the U.S. and Coalition forces involved, he was not smart enough to heed this advice.

I have seen the difficulty of operating in an urban environment firsthand in the 19 months I spent in and around the city of Fallujah, Iraq, after which I coauthored *Fallujah Redux: The Anbar Awakening and the Struggle with Al-Qaeda* (2014). The enemy could easily blend into the dense urban population, snipe from urban hides, emplace improvised explosive devices (IEDs) in the normal detritus on city streets and sidewalks, and use mortars and machine guns in areas where the surrounding buildings amplified the noise and made it impossible to pinpoint where the fire was coming from, which worked to our disadvantage. We had much better equipment and training, but we

[1] Michael Howard, "Military Science in an Age of Peace," *Journal of the Royal United Services Institute for Defence Studies* 119, no. 1 (March 1974).

were hard-pressed in that environment to get to the point that we were clearly winning. Due to our history of overwhelming strength, if we are not clearly winning, we are losing in the eyes of all concerned. The tactics of the weak work very well in urban environments and those around the world who wish us ill are very well aware of that fact.

More recently, I was the target engagement authority approving air strikes in support of Iraqi forces as they tried to retake ar-Ramadi in 2015–16, which set the stage for the much bigger and more difficult fight to retake Mosul in 2016–17. Watching both of these fights closely, including how a technologically savvy enemy used every aspect of the urban jungle, particularly the extensive use of underground tunnels and facilities, to counter our technological advantages was eye opening. While I would never say that the Islamic State of Iraq and the Levant (ISIL or Daesh) forces were anywhere near peer competitors, they were certainly more formidable than the insurgents we had faced in Fallujah a decade before, and the Iraqi armed forces had a very difficult time rooting Daesh out of Iraqi cities and towns.

There are many other instances of urban fighting in our long history with varying degrees of complexity and difficulty. Grozny, the capital of Chechnya, was particularly rough, as has been much of the fighting in the urban areas of Syria. Whereas other forces seem to be unconcerned with collateral damage and civilian casualties, this issue is always a major consideration for the American way of war. It is part of who we are and can never be brushed aside. Our foes know this and frequently use it to their advantage. Even when not involved in large-scale combat, megacities are also the sites of massive protests that have enabled regime change; this phenomenon was seen in Egypt, Algeria, Sudan, and Ukraine, and attempted in Syria. All of this means that cities really matter because this is generally where decision makers and opinion shapers, especially the media, live and work. When they can influence millions to do their bidding, the impact of that effort cannot be ignored as we try to avoid urban centers for more favorable terrain on which to fight.

All of the above is bad enough, but when you start to look deeply into the world's megacities, with populations in the millions and with large areas of slums and shantytowns that are a nightmare to travel

or fight through, we need to take this subject more seriously. How will our air support assets, particularly helicopters, deal with the wind patterns in urban canyons as well as people firing down on them from the higher floors of tall buildings? How do we effectively deal with mass migrations out of areas where the fighting is occurring, especially if the enemy is trying to keep them from leaving? How do we deal with infrastructure damage that allows massive amounts of raw sewage or potent industrial chemicals loose from their usual confines? These are just a few of the considerations that will have a massive impact on our ability to fight effectively in urban centers.

The answer to these challenges is that we need more members of this profession, in the words of Lieutenant General Paul K. Van Riper (Ret), to cast their net widely—read, study, and reflect on the changing character of warfare. We need to be honest about our own limitations in understanding and to seek ways to better understand these challenges through honest wargaming as well as the exploration of existing megacities with staff rides and discussions with city officials who deal with these challenges every day. We also need to be humble enough to learn from others' experiences, such as that of the Brazilian armed forces. How did they deal with the large gangs of children running loose in the favelas of Rio de Janeiro to provide security and stability for the 2016 Olympic games? Have any of the Services asked them or visited to get a boots-on-the-ground perspective of the terrain? These are the activities professionals must perform, but we also need to ensure we listen and learn, an unfortunate and reoccurring shortfall from the past. All of the elements that left the battlefields of World War I in carnage (e.g., fast-firing artillery, barbed wire, and machine guns) existed during the 1904–5 Russo-Japanese War and European and U.S. forces sent observers to see what we could learn. Apparently, it was not much, as evidenced by the events of 1914–18. If we can get this approach right with regard to humble, inquisitive leaders who are in a never-ending quest to better understand a profession that we can never hope to master, these same leaders will build the foundation of the future force and mentor those coming along behind them who will take that force into battle.

This publication, as well as many of the efforts currently under-

way across Marine Corps Training and Education Command, pushes away from Industrial Age learning processes and gets to those more appropriate to the twenty-first century, seeking to better understand future requirements. We cannot avoid unpleasant truths or uncomfortable environments. We have to face things head-on, experiment, and fail, but then learn from those failures to ensure that we have the type of military force we need for the operational circumstances of the near future. A century ago, our predecessors did not get it right and the butcher's bill was significant. We owe those we lead a great deal more than trying to figure it out as casualties mount from our mistakes. In most professions, that behavior would be considered malpractice, and it is simply unacceptable for the U.S. military.

Major General William F. Mullen III
Commanding General
Training and Education Command
U.S. Marine Corps

complex terrain

Introduction

Henrik Breitenbauch, PhD, and Benjamin Jensen, PhD

The future is urban, and so the future of strategic competition and warfare also reside inside the city. For millennia, people have moved from the countryside to villages and towns that have grown to cities and, increasingly, megacities. People do so to benefit from the networking advantages that a high population density provides in terms of opportunities, services, and order. In the West, this urban trend accelerated with industrialization in the nineteenth century.[1] Globally, urbanization is now on the uptick too, and it is one of the fundamental trends driving the evolution of human societies worldwide.[2] But as global population growth continues, so too will security problems of and in cities, including those where military means are perceived as warranted, utile, and legitimate.

This book explores military operations, including indirect support to other interagency actors and functions in dense urban terrain and megacities. *Dense urban terrain* describes urban areas with high population densities that, in the developing world, often outstrip the

[1] For a historical overview of early patterns of urbanization, see Kingsley Davis, "The Origin and Growth of Urbanization in the World," *American Journal of Sociology* 60, no. 5 (1955): 429–37; A. M. van der Woude et al., eds., *Urbanization in History: A Process of Dynamic Interactions* (Oxford: Clarendon Press, an imprint of Oxford University Press, 1995); and Richard T. LeGates and Frederic Stout, eds., *The City Reader*, Urban Reader Series, 5th ed. (New York: Routledge, 2015).

[2] For an overview of the relationship between globalization and urbanization in this regard, see Christopher Chase-Dunn and Bruce Lerro, *Social Change: Globalization from the Stone Age to the Present* (New York: Routledge, 2016).

capacity of local governance systems to exert formal control.[3] The term *megacity* describes a city with a population of 10 million or more. These environments define patterns of human settlement. In 1950, only 30 percent of the world's population lived in cities compared to more than 55 percent in 2018.[4] Much of this growth is concentrated in large, urban centers that connect a global flow of goods and ideas. By 2030, there will be more than 40 of these megacities.[5]

These cities act as hubs in a global network, connecting both formal and informal flows and transnational groups competing for power and influence.[6] As such, they mark the new strategically important terrain in global competition. In the developing world, many of these rapidly growing areas are defined by informal settlements, corruption, illicit networks, and a wide range of grievances produced among competing groups. For this reason, David Kilcullen defines urbanization as one of the defining trends shaping the character of warfare.[7] Along with population growth that amplifies scarcity and the geographic location of most megacities in the littorals, these urban areas have the potential to be sites of future great power competition, irregular warfare, and battles for the U.S. Marine Corps.

The cityscape presents the military tool, organization, and profession with a number of challenges. It offers conditions that differ radically from those found in the countryside. Some of these conditions challenge the military ethos to focus and sharpen its edge as

[3] For an overview of dense urban terrain, see David N. Farrell and Dr. Megan E. Ward, *U.S. Army TRADOC G-2 Mad Scientist Megacities and Dense Urban Areas Initiative: Data Collection and Analysis* (Hampton, VA: MITRE, 2016); and "Urban Warfare Project," Modern War Institute, U.S. Military Academy at West Point.

[4] "World Urbanization Prospects 2018," United Nations, Department of Economic and Social Affairs, Population Division.

[5] *Megacities and the United States Army: Preparing for a Complex and Uncertain Future* (Washington, DC: Chief of Staff of the Army, Strategic Studies Group, Department of the Army, 2014); and *The Character of Warfare 2030 to 2050: Technological Change, the International System, and the State*, with a foreword by Benjamin Jensen and John T. Watts (Washington, DC: U.S. Army Future Studies Group, 2018).

[6] On global networks and military competition, see Charles Cleveland et al., *Military Strategy in the 21st Century: People, Connectivity, and Competition* (New York: Cambria Press, 2018).

[7] David Kilcullen, *Out of the Mountains: The Coming Age of the Urban Guerrilla* (New York: Oxford University Press, 2013).

they exacerbate well-known problems in traditional military operations by compressing space, time, and the tactical to strategic continuum.

Other aspects of cityscapes call into question issues taken for granted by many within the military profession. They challenge us to be less hell-bent on hard distinctions between military and nonmilitary tasks, and to approach security problems more holistically. For American and other militaries that are subject to the laws of war and a particular set of politically decreed normative demands about the ways of warfare that they are expected to deliver, the city's compressed character poses a particular operational problem and operational challenge.

Because of the urbanizing megatrend, modern military organizations have no choice but to embrace and react to these conceptual and practical challenges related to warfighting as well as to stabilization, peace, and policing operations in an urban setting. This book explores how different aspects of these challenges are being identified and analyzed, how they are being solved or addressed, and how to think conceptually about them as a first step toward incorporating them into the ways—doctrinal or otherwise—of our strategic approach.

The 13 chapters in this book explore different aspects of the sociopolitical and strategic conditions underlying and shaping urban military operations. The analyses play out and examine tensions between two poles, one more traditional, linear, and purely military, the other more nontraditional, nonlinear, and less purely military. The more traditional pole includes issues related to warfighting, top-down organization, and supply driven approaches. The other includes issues related to peace and security operations, bottom-up organization, and demand-focused approaches. The analyses show that the conditions offered by the city, including its human terrain, bring out tensions between the two poles, feeding new operational dynamics. These tensions can be conceptualized through three distinctive markers.

Distinguishing between issues related to warfighting in a narrow sense on the one hand and to broader security efforts to create or sustain peace on the other makes sense in the urban environment because of the ubiquitous presence of civilians and civil society.

For example, Pakistani Marine Lieutenant Commander Muhammad Maooz Akrama explores the utility of enhanced company operations in a hybrid police-military model with a starting point in bottom-up competition for authority from embedded nonstate actors. He argues that paramilitary forces can indeed exert policing functions, provided they have the proper skills and intelligence. U.S. Marine Corps Major Alexandra V. Gerbracht proposes how, in an urban setting, military lessons can be drawn from conditions, strategies, and practices of police. David E. Johnson and M. Wade Markel examine the more warfighting-related case of the battle of Sadr City, Iraq, in 2008. Here, the objective was "not to take and clear Sadr City, but to create conditions that would make it impossible for the insurgents to operate effectively and possible to restore security to the broader population." The commanders were inspired by Julian S. Corbett's defensive logic to shape the battlespace through the construction of a long wall to "bring the enemy to you." Even if the operation had a traditional "focus on enemy fighters and their capabilities," this was still a case where offensive and defensive operations were streamlined into a larger operational framework that included stability or reconstruction efforts.

U.S. Marine Corps Major Robert D. Barbaree's chapter further explores the consequences of such comprehensive approaches to call for an "operational art beyond military considerations" that includes integrated interorganizational cooperation. One conclusion that emerges from this discussion is that it would be a "mistake" to "address urban warfare from a purely military perspective." Marine Corps Major Jonathon T. Frerichs, in a comparison between a Colombian and Russian case, also draws on Alfred T. Mahan and Julian Corbett to explain the two approaches: "mass and attack" versus "influence at decisive points." Where the Colombian government applied a political strategy, only intermittently with military means, the Russians did the opposite. For the Colombians, a Corbettian approach meant disrupting and influencing city lines of communication, including in a structural way, to produce political and social efforts to mend economic inequality, reform the political and security system, and so on. Thus, "maneuver for the Colombian government was obtained by generating and exploiting advantages simultaneously along multiple lines of

operation for systemic effect." In conclusion, Corbett wins over Mahan as "control and isolation" are not "realistic" options in a megacity, but influence, instead, "is achievable."

In their chapter, Henrik Breitenbauch, Mark Winther, and Mikkel Broen Jakobsen propose a new way to think about the divide between warfighting, peace operations, and special operations. They organize them as corners of a triangle whose internal space then offers logical subdivisions of practical operational challenges. They argue that, while megacities challenge militaries to think more holistically and embrace police/peace operations, their size also renders territorial control—the aim or presupposition of both war fighting and peace operations—almost impossible. Operational conditions for both thus become more like those that underlie special operations, though without territorial control.

The distinction between supply versus demand focuses on the interplay between the solutions and diagnoses offered in the shape of efforts, plans, and analyses by the military operations provider on the one hand and the problem sets and issues as they are experienced by sociopolitical states and communities, as well as on the individual level in the cities themselves, on the other. Top-down versus bottom-up captures the distinction between organized, linear problem-solving and strategy-making by centralized state and multinational authorities contrasted with more emergent, informal, and localized forms of solutions and order. Together, these distinctions help us focus on how well solutions fit the problems, and how and by whom problems are perceived and formulated.

For example, as with other contributors, Barbaree approaches the system that planners must analyze and consider addressing in a wider, interorganizational approach even at the operational level to achieve a more ground-based unity of effort between civilian and military supply-side actors. Frerichs proposes a concept of distributed influence to repair the fact that "current urban warfare concepts fail to set the conditions for maneuver by military forces in a megacity." In essence, the military organization has a hard time understanding the complexity of the megacity. This must be understood as a system of nodes with underlying subsystems. It is the connectivity or pattern of

connection of these nodes that is decisive for planners. Frerichs proposes the adoption of a systemic operational design that goes beyond targeting to aim instead for distributed influence to critical nodes that builds on a systems approach.

Air Force Major Christina L. Manning focuses on how the systemic approach means that the opportunities for manipulation of networks goes both ways; irregular actors can also exploit and shape these to their advantage. Planners consequently cannot ignore the delicate balance that exists between population and resources. Drawing on Kilcullen, Manning proposes a symbiotic warfare concept where the object is to control resources without disrupting daily operations of community—to gain influence with the destruction that follows a siege. Colleen Borley also proposes a megacity concept of operations that embraces the systemic and civil-military mix. Here, the analysis and deep knowledge about weakness and connectivity of the city system to its surroundings appear key to bringing about, in the terms of Sun Tzu, a "victory without fighting."[8]

More specifically, Colin R. Relihan examines the opportunities and challenges that arise from modern digital communication technologies for local populations to organize from, including those in a counterinsurgency setting. Control of related physical infrastructure, including the ability to destroy or protect, thus becomes a central element in a wider struggle over virtual resistance networks that the counterinsurgent can sustain and support. Marine Corps Major Joseph I. Farina also examines the role of modern communications and social media in urban operations and notes how the utility of cyberspace empowers both nation-states and nonstate actors relative to the United States military. Modern communication channels enable instantaneous, localized mobilization of a cyber levée en masse to converge on a technologically superior adversary. Marine Corps Major Nathan J. Storm, in examining the problem of air dominance in a complex cityscape, points to the utility of small, distributed air systems as a response to the practical problem it poses. An increased reliance

[8] *Sun Tzu on the Art of War: The Oldest Military Treatise in the World*, trans. Lionel Giles (London: Luzac, 1910).

on unmanned aerial systems would employ less expensive schemes in higher numbers to ensure sufficient density of presence or even swarming effects. However, such practical problems also point to deeper conceptual issues, as Storm argues, and this change to support the commander would also require a change in the air theory of victory.

In the end, urban topography presents the military operator with difficult challenges regardless of the nature of the operation. Warfighting versus peace and security operations, top-down versus bottom-up, and supply versus demand are supplementary rather than mutually exclusive categories that can help us understand and navigate these challenges. Many, but not all, things that count as supply would fall under top-down. Looking for supply that is or can be bottom-up, or for how demand issues also get shaped by bottom-up dynamics may be a productive way to ask questions. Taken together, they prod us to realize how the city setting brings forth classic tensions between the intent behind military operational design and how things actually work on the battlefield. Carl von Clausewitz famously warned that the gravest error the field commanders could commit is to not clearly acknowledge the character of the conflict in which they partake. The cityscape makes this potential schism between the tools that we bring to the fight and the fight itself even more acute.

The chapters of this book testify to the rich and varied ways in which urban military operations appear as a salient policy issue and object of study. As they reflect a variety of aspects of military operations in dense urban terrain, the contributions also indicate how the city as a backdrop for military operations exemplifies a number of traits that are likely to shape future warfare and its conditions more generally. It is a truism that, in war and strategic affairs, quantity has a quality of its own. The city presents us with a comparable argument: much as diamonds result from the compression of carbon, the urban battlespace, by compressing time and space, accentuates and highlights aspects of modern warfighting as well as of broader security operations. In that way, we argue, where the cities and their military operations go, so goes the war and security agenda more generally.

Each of the chapters in this volume contribute in concrete ways to our understanding of challenges facing current urban operations.

For that reason, it is our hope that this volume will find an audience beyond scholars and that it will be read by and shared among thinking practitioners of urban military and security issues whether they are in uniform or not. Learning and adaptation is an iterative process that begins with an open and inquisitive acknowledgment of whether formal and informal ends, ways, and means are aligned and, if not, asking what can be done to make them so. We hope this book encourages scholars and practitioners alike to ask better questions about supply-side assumptions and strategies as well as the dynamic demand side of the urban battlespace.

CHAPTER ONE

Third World Megacities

An Illusion of Control

Lieutenant Commander Muhammad Maooz Akrama, Pakistan Marines

August 2017 in Karachi, Pakistan, was the height of a gang war in the notorious neighborhood of Lyari, people armed with rocket launchers fired on two police armored vehicles. One rocket destroyed the lead vehicle, as gunmen sprayed the officers with bullets. These veterans of Pakistan's urban war bristled at the obstacles facing their efforts when combatants in the streets carried more modern weapons than the police force. In days not too distant, Lyari's police would expend more than 3,500 rounds on a busy day and pick up bodies lying in the piles of garbage. Since then, paramilitary forces patrol Karachi's streets and attacks of magnitude have become rare. While the police crackdown has been effective, it has empowered the military with a level of control that may be difficult to pull back, in spite of the costs that now strain the national budget.

INTRODUCTION

Rivers were once an important part and center of development for human civilizations. The easily cultivated land around them provided the opportunity for livelihood. As industrialization grew and science and technology advanced, the bulk of economic activity shifted from the

agricultural lands to the industrial cities. As some cities became more dynamic in their economic activities, the influx of people increased and enlarged to the point where those cities converted into megacities with a population of more than 10 million each. Prior to 1950, only New York City had achieved this population, though with the coming of the twenty-first century, 37 cities now hold this distinction. The civilizations that sprang up around the rivers are now growing around the densely populated and networked environment of megacities. This phenomenal population growth has created a control dilemma for government authorities faced with meager resources and the growing influence of nongovernmental organizations (NGOs) in most developing megacities. As cities grow, often unplanned, they become increasingly difficult to control. This control dilemma is a defining feature of conflict in dense, urban terrain.

THE RESILIENCY AND COMPLEXITY OF MEGACITIES

Resiliency

The development of cities into megacities is not a complex phenomenon in itself. The complexity arises due to its unique character and behavior, which are entirely different than that found in a basic urban environment. These cities generate the capacity to provide and absorb, attracting larger and larger populations. As the population increases, it produces the economic activities that attract multinational companies and transnational organizations, which further connects the city to the global commons.[1] As the process continues, the influx of people rapidly increases—even faster in third world or developing countries—to the point where the change depletes its ability to fulfill social and security requirements of the population. However, the megacity continues to generate economic activities and opportunities. As

[1] The term *global commons* refers to resource domains that do not fall within the jurisdiction of any one particular country and to which all nations have access. International law identifies four global commons: the high seas, the atmosphere, Antarctica, and outer space. Nico Schrijver, "Managing the Global Commons: Common Good or Common Sink?," *Third World Quarterly* 37, no. 7 (2016): 1252–67, https://doi.org/10.1080/01436597.2016.1154441.

the city expands exponentially, the governing body loses its control. As more national and international organizations, companies, political parties, and ethnic groups become part of that system, the megacity develops a complex network of different social, economic, religious, and ethnic groups. All the networks exert their influence on the society. This situation provides ample opportunity for criminals, terrorists, and illegitimate organizations to infiltrate the community and merge into its existing networks.

David Kilcullen describes the cities in this new emerging environment as a living, breathing organism.[2] Analyzing the concept of living organisms in the context of megacities is interesting. As an analogy, the human body is an amalgam of various systems working together. No one system can work without the help of others, so they are strongly interdependent. Thousands of arteries, veins, and blood capillary networks in the human body interconnect with each system. The systems and functions of an urban setting work in the same manner. As the brain controls the function of the body parts, the state/government plays the role of the brain in the society. However, megacities' high level of resiliency makes them self-sufficient. In the case of nonavailability of any system, or if the government is unable to provide the requisite resources, megacity organisms build their own systems through the interconnected network environments. Sociologist Manuel Castells from the University of Southern California argues that the power in the network society exercises through networks.[3] All the legal or illegal organizations, national or multinational, nonstate or state actors, exercise their influence over the behavior of the habitats of the megacity. Castells claims that "all networks of power exercise their power by influencing the human mind predominantly."[4]

As the vested interests of many multinational, transnational, and national organizations, criminal organizations/gangs lie within the megacity, they all play their part to produce the necessary resources

[2] David Kilcullen, *Out of the Mountains: The Coming Age of the Urban Guerrilla* (New York: Oxford University Press, 2013), 50.
[3] Manuel Castells, "A Network Theory of Power," *International Journal of Communication*, no. 5 (May 2011): 773.
[4] Castells, "A Network Theory of Power," 785.

to run the system. The more megacities produce with their system outside the official network through NGOs, the weaker the government's span of control becomes, which creates an illusion of control. This phenomenon is more pronounced in the megacities of developing countries than in developed countries, due to their meager resources.

A megacity's dynamic economic activities play the role of an economic nucleus for that country. This role becomes more powerful in the developing world. According to an estimate from The Nation, Pakistan's news agency, Karachi alone contributes 42 percent of Pakistan's gross domestic product (GDP) and 70 percent of the total tax revenue, yet represents only 10 percent of the country's total population.[5] Megacities are efficient, dynamic entities that aggregate wealth, cluster cheap labor, and provide opportunities for advancement. Jonathan Kalan focused on the World Bank's development unit: "As the countries develop, people and economic activities always become more concentrated in urban areas. This process of 'agglomeration economics' is a good thing because it reduces production costs, allows the businesses to share infrastructure, and provides large labor markets."[6]

Complexities and Networked Environment

As the megacity generates high levels of social and economic activity, it also generates a conflict environment. Kilcullen describes the drivers of this activity as megatrends: urbanization, population growth, littoralization, and connectedness.[7] He argues that most of the urbanization happens in the developing world, and population growth is becoming an urban phenomenon. He further explains that, as people concentrate in cities of poor countries with the scarcity of resources in poorly governed areas, it generates a contested environment for the resources. This hypothesis may be true for a normal urban environment, but in case of a megacity, it may be debatable. Kalan considers that millions of people may live in poverty, but the vast, dense con-

[5] "Karachi Contributes Rs [Rupees] 16 Billion to GDP a Day," *Nation*, 9 April 2012.
[6] Jonathan Kalan, "Think Again: Megacities," *Foreign Policy*, no. 206 (2014): 70.
[7] Kilcullen, *Out of the Mountains*, 28.

centration of people in megacities in developing nations can benefit from the economic output the megacity generates and the opportunities it provides.[8] He also briefly covers the idea of a resilient megacity system, which can generate self-support. For example, Karachi, a megacity of Pakistan, has a high rate of violence and accidents. The government emergency services are far from effective. The lack of resources and the government's inability to provide adequate care to the effects of violence left the city to fend for itself, resulting in the city's first and largest volunteer ambulance service through the Edhi Foundation begun by philanthropist, humanitarian, and social activist Abdul Sattar Edhi. The Edhi Foundation runs eight hospitals, nursing homes, orphanages, rehabilitation centers, and women's shelters within Karachi. It also operates an air ambulance service, surgical units, mobile dispensaries giving free medical care, and two blood banks. Additionally, 15 Edhi homes provide the necessities of life to destitute, unwanted, and disabled children as well as shelter and solace to runaways and homeless people and the unwanted elderly.[9] These homes are the main lifeline for the people living in slums. The Edhi Foundation runs solely on donations arranged by a network of thousands of volunteers and professionals working around the globe for this charitable organization.

Another distinctive characteristic of a megacity is its connectedness. Kilcullen describes it as an internal and external phenomenon.[10] He argues that, with the advancement in communications, people living in slum areas of a megacity are still connected to the world. This social and economic connectivity of a megacity with other regions increases its sphere of influence. This connectedness, however, can cause the spillover of any conflict from the megacity into the other region. A densely populated environment also can give way to terrorists, gangsters, smugglers, and criminal organizations to nest within the society in a "black market economy." They turn their black money

[8] Kalan, "Think Again," 70.
[9] "About Edhi Foundation," Edhi.org.
[10] Kilcullen, *Out of the Mountains*, 32.

white by merging it with the legitimate network.[11] These criminal organizations, as part of their connection to the system, provide resources and support to the society to gain influence, all while operating their illegitimate networks. Kilcullen expresses the view that any network is just a means of connectivity; it is the behavior within the network that is licit or illicit.[12] Castells explains the importance of programmers and switchers in the megacity network system—the programmers have the ability to constitute a system, and switchers have the ability to connect that system through other networks. This is the counterargument proposed by Castells that focuses on the concept of programmers and switchers, whereby programmers constitute and reprogram a network and switchers connect it with other networks to ensure support and strategic cooperation.[13] In a megacity networked environment, it is an extremely arduous process to identify black from white as its density makes everything lie in a spectrum of gray; licit activity may support an illicit cause. Thus, the credibility or status of the programmer and switcher and their objective makes a network licit or illicit.

The point of concern for the megacities is not the availability of a life support system for its inhabitants, but the transparency of the organizations in the network providing a support system while operating outside the government realm. The growing influence of the NGO over the megacity weakens the government's span of control. This influence allows different legitimate or illegitimate organizations to move and operate freely in the megacity. In this regard, a small case study from 1992 about a political organization active in the megacity of Karachi in the late 1980s is relevant. The political party Muttahida Qaumi Movement (MQM), or United National Movement, started an ethnicity-based people's rights movement in the rural area of the province against the ruling government. The movement gained rapid popularity among the masses of Karachi residents from all walks of life, especially the poor and middle class. As the group gained popularity,

[11] Adil Anwar Daudi, "The Invisible Bank: Regulating the Hawala System in India, Pakistan and the United Arab Emirates," *Indiana International and Comparative Law Review* 15, no. 3 (2005): 619–54.
[12] Kilcullen, *Out of the Mountains*, 34.
[13] Castells, "A Network Theory of Power," 776.

it exerted greater indirect influence over the government, because it controlled the laboring and working classes of the city, causing the government to lose control of the city. The movement became so influential that a militant wing gained power in its ranks, harassing the elite and business classes for ransom and occasionally violently confronting law enforcement agencies (LEAs). By way of contrast , LEAs avoided confrontation due to MQM's strong hold on the public and its influence within government agencies. The situation worsened and reached its tipping point when Prime Minister Benazir Bhutto launched a full-spectrum army operation against MQM—Operation Clean Up.

The movement was so well-organized that MQM had a representative on every street of Karachi. As the operation pushed forward, the militant wing quickly dissipated, and some of the top leadership of MQM fled the country. The Pakistan Army's role in this operation caused great public outcry, not just in the national media but also internationally, forcing the army to abandon it without much success. Into this vacuum, the MQM militant wing regrouped vigorously, becoming much more violent, not just toward the LEAs, but the general public as well. The organization converted into a militant party with a political wing. The government operation failed due to its lack of control over Karachi. It could not afford to eliminate the party without disrupting the city, which was now wholly controlled by MQM.[14] Any disruption in the city meant the disturbance of the lifeline of the country as Karachi serves as the economic hub of the nation. This demonstrates the ease with which the government can lose control in a megacity. If a terrorist group combined forces with a party like MQM, it would give them not only a safe haven and freedom of movement, but also a larger connectivity to the world. Such situations would then require military intervention, possibly from outside the state.

In a megacity, many things can induce military intervention. Despite being resilient, the megacity cannot prevent a nonstate actor from being an irrational one, operating from a megacity while taking advantage of its dense, networked, and complicated environment.

[14] Steve Inskeep, *Instant City: Life and Death in Karachi* (New York: Penguin Press, 2011), 168; and Mobeen Azhar, "City at War—Where a Police Officer Is Killed Every Day," BBC News, 19 November 2014.

The military operations conducted in a megacity may range from staging a full-spectrum war to achieving a limited objective. These operations may be carried out against the state or a nonstate actor who may be in consonance with, or against the will of, the public. Regardless of the actor, operations within megacities require a special operating concept that varies from basic urban operations, keeping in view the unique, complex challenges posed by the megacities. Most of the world's armed forces are organized, trained, and equipped to fight in a basic urban setting. It will be a significant challenge for them to prepare for operations in a megacity.

MEGACITY CHALLENGES TO MILITARY OPERATIONS: KARACHI CASE STUDY OF URBANIZATION AND ETHNIC MILITANCY

As industrialization grew with the advancement of science and technology, the bulk of economic activity shifted from the agricultural lands to the industrial cities. As cities became more dynamic in their economic activities compared to their surrounding areas, the influx of people increased and continued to the point where those cities became megacities. The rapid growth of megacities, combined with insufficient resources, creates a central dilemma for governments—a phenomenon more pronounced in developing countries. In this regard, the case study on Karachi's ethnic militancy and failed military operation provides an opportunity to analyze how the government can lose control in a megacity, due to reasons ranging from increased urbanization, lack of resources in the hands of different nonstate actors and NGOs, and the problems inherent in a military operation in a megacity environment. This situation also explains how megacities build their resiliency in a networked environment, despite the lack of resources and government control.[15]

[15] For more information on these concepts, see Seth G. Jones and C. Christine Fair, *Counterinsurgency in Pakistan* (Santa Monica, CA: Rand, 2010), 33–84; Zia ur-Rehman, "Crime Down in Karachi, Paramilitary in Pakistan Shifts Focus," *New York Times*, 7 November 2015; and Vazira Fazila-Yacoobali, "The Battlefields of Karachi: Ethnicity, Violence and the State," *Journal of the International Institute* 4, no. 1 (Fall 1996).

Historical Background

In the eighteenth century, Karachi was a small fishing town until traders started to use the location as a natural port, and settlement increased as a result. By 1839, when the British captured the city, it already held significant value as a port city. Realizing the importance of this coastal town, the British built an infrastructure that included the port, roads, and railway lines and connected Karachi with the rest of India and other cities of the world. By the twentieth century, the city was well established and was the home of people from mixed ethnic and religious backgrounds, largely traders and businessmen. Four major waves of migration occurred in the decades that followed.

When Pakistan achieved independence in 1947, Karachi was chosen as its capital. The partition of India and Pakistan resulted in one of history's largest migrations.[16] Karachi received a massive influx of Muslim refugees from India. Those refugees were commonly known as Mohajir, or Urdu-speaking Muslims.[17] The population of Karachi increased dramatically with their arrival, growing 432 percent between 1941 and 1961; this is a rate of growth that has never been experienced by any other city of the world in human history.[18] The Mohajirs quickly established themselves and became a dominant force in Karachi, in government, and in trade due to their higher level of education.[19] By the 1960s, the city was well on its way toward the economic and infrastructure development it would need to become an important hub of trade and economics of Southeast Asia, or the "City of Lights."[20] The development of Karachi caused a secondary wave of internal migration by other ethnic groups, of which the Pashtuns were the most prominent. The third phase of migration occurred from the

[16] Vazira Fazila-Yacoobali Zaminder, "India-Pakistan Partition 1947 and Forced Migration," in *Encyclopedia of Global Human Migration* (Hoboken, NJ: John Wiley, 2013), https://doi.org/10.1002/9781444351071.wbeghm285.
[17] Azhar, "City at War."
[18] Arif Hasan, *Understanding Karachi: Planning and Reform for the Future* (Karachi: City Press, 2002), 521.
[19] Nadeem F. Paracha, "The Evolution of Mohajir Politics and Identity," *Dawn*, 20 April 2014.
[20] Nadeem F. Paracha, "Visual Karachi: From Paris of Asia, to City of Lights, to Hell on Earth," *Dawn*, 26 September 2014.

1980s to the 1990s, when an Afghan refugee influx occurred due to the Soviet intervention in Afghanistan.[21] The fourth phase of migration occurred from 2004 onward, when a large number of internally displaced people from Federally Administered Tribal Areas migrated to Karachi as a result of military operations.[22] Presently, Karachi has the largest Pashtun population of any city in the world, even more than Peshawar, Pakistan, or Kabul, Afghanistan, representing almost 25 percent of the population.[23] Karachi has been called a microcosm of Pakistan because of its ethnic diversity.

The Conflict

The ethnic diversity of Karachi also became the root cause of its political violence. Ethnic clashes grew in intensity as civic resources became more strained with every wave of migration. As Kilcullen describes, the drivers of conflict are megatrends, such as urbanization, population growth, littoralization, and connectedness.[24] He explains that, because people concentrate in cities in poor countries, the scarcity of resources in poorly governed areas generates conflict over the resources. In the late 1970s and early 1980s, ethnic violence increased between university student organizations of Pashtun and Mohajir ethnicities, and it subsequently turned into political violence. Two students from Karachi University started the ethnic-based students' organization, All Pakistan Mohajir Students Organization (APMSO), which later converted into the political party MQM, to advocate for the rights of the Mohajir community. Due to its ethnic focus, the party quickly became popular in the Mohajir community, which accounts for almost half of the population of the city.[25] As the MQM grew in strength and numbers, the clashes

[21] At the time of the intervention, the area was still known as the Union of Soviet Socialist Republics, or the Soviet Union; however, by 1991, the Soviet Union would cease to exist, becoming known globally as Russia or the Russian Federation.
[22] Masroor Ahmed and Afifa Kiran, *Karachi: A City that Refuses to Surrender*, vol. 5, no. 1, NDU monograph series (Islamabad, Pakistan: National Defence University, 2014), 8.
[23] Zia Ur Rehman, "Demographic Divide," *Friday Times* (Lahore, Pakistan), 15–21 July 2011.
[24] Kilcullen, *Out of the Mountains*, 28.
[25] Rehman, "Demographic Divide."

with Pashtun ethnic groups became more violent on different issues. In the early 1980s, the large influx of both legal and illegal Afghan refugees increased the size of the Pashtun community. As the Russian war in Afghanistan progressed, weapons and personnel were transported through Karachi to Afghanistan; however, not everything reached its destination. Arms and drug dealing increased drastically with the influx of refugees, and the local gangs and criminals also had easy access to weapons. The ethnic and political parties also established militant groups armed with illegal weapons. In this volatile atmosphere, the Pakistani government lost control of the city.

The Consequences

Megacities are efficient, dynamic entities that aggregate wealth, concentrate cheap labor, and provide opportunities for advancement. The sheer volume of economic activity makes them extremely resilient. Everybody working in the megacity has some vested interest in its success. Despite the lack of control by the government and LEAs, the system was still functioning, even with the absence of the basic necessities of life and the violent engagements between the ethnic and religious groups in Karachi in the late 1980s. The NGOs were able to support their local communities, exercising more control on those areas, which were mostly slums in the suburbs of Karachi. Few nonprofit organizations came to provide the basic facilities for the poor people in Karachi. The different ethnic groups provided security to their own communities against the other ethnic groups.

The point of concern for megacities is not the availability of life-support systems for their inhabitants but the transparency of the organizations in the network that provide support systems, operating outside of the government. The growing influence of NGOs over megacities weakens the government's span of control. Because the vested interests of many multinational, transnational and national organizations, and criminal organizations/gangs lie within the megacities, they all contribute to produce the resources to run the system. The more megacities produce with their systems through outside official networks and NGOs, the weaker the government's span of control

becomes, until it finally stands largely as an illusion. Karachi is an example of this theory in practice.

The unprecedented boost in the population of Karachi puts the governing bodies in a difficult situation. Currently, the city is growing at a rate of 5.4 percent annually, making it one of the fastest growing cities of the world. An estimated 1 million people from the different parts of Pakistan migrate to Karachi and take up residence in unplanned slums, which are growing at a rate of 100,000 plots annually.[26] Half of Karachi's population still lives in unplanned urban areas, where the government authorities have failed to provide even the basic facilities of life. Most of these social services are being provided by the private sector, where the mafia has filled the gap. These mafias are controlled by different ethnic groups. The major militant ethnic groups have the political backing from segments of the government. This situation has made the life of LEAs even more difficult, as they cannot operate against those groups and, in some cases, cannot even enter the militants' safe havens. As Anthony Davis wrote of Karachi in Jane's Intelligence Review,

> Mafia bosses shelter behind politicians; politicians cultivate the mafias and hire their trigger-men; armed party activists moonlight as bandits; and common riff-raff move in on the mayhem. Intelligence agencies, meanwhile, use terrorists to counter terrorists; while the police, corrupt, demoralized and under-manned, resort to terrorist methods themselves. Normal citizens survive as best they can.[27]

The government did not pay particular attention to the increasing ethnic violence and failed to realize the criticality of the situation until the early 1990s.

Military Operations and Lessons Learned

In the early 1990s, the lawlessness in Karachi reached its peak, with

[26] Salman Qureshi, "Karachi's Population Explosion Far Greater than Experts' Calculations," *Pakistan Today* (Lahore, Pakistan), 6 December 2011.
[27] Anthony Davis, "Pakistan: State of Unrest," *Jane's Intelligence Review* 11, no. 1 (1999).

gangs related to political parties running extortion rings, performing targeted killings, ransoming businesses, as well as stealing and robbing. A systematic weak response by the state further escalated the situation. The political affiliations of the militants with the ruling party damaged the institutions and governance of the city.[28] The politicization of the police played a pivotal role in the downfall of the police department of Karachi. In many cases, the police officers who threatened politically affiliated criminals were sidelined or removed from their posts by officials. In extreme cases, militant gangs actively targeted police officials. In 1992, the Pakistan Army launched Operation Clean Up against the militants in Karachi to clear the Mohajir neighborhood of radicals.[29]

The military operation launched by the Pakistan Army did not have much success. While the army did apprehend a number of gangsters, militants, and criminals, it failed to break the gang networks. The military operation also caused the defamation of the army countrywide due to extrajudicial killings and hatred among the local populace. The army also failed to install a long-term, follow-on security mechanism that could further improve the security situation. Some of the major causes of this failure include:

- The army was operating in bigger (company-size) teams, which restricted its movement in the congested areas and caused considerable delay in search operations. The militants moved in very small groups, they were swift in their movement, and they were well versed with the internal routes.
- The army did not try to maneuver through the networks in which the different gangsters and militants operated, which offered an easy escape to those network operators and to some of the higher commanders of the groups.
- The militants' intelligence network moved much faster than the army units operating in the city. The militants' ability to

[28] Huma Yusuf, "Conflict Dynamics in Karachi," *Peaceworks*, no. 82 (October 2012): 8.
[29] Amir Mir, "General Janjua—The Man Behind 1992 Operation," *News Daily*, 4 September 2009.

quickly blend into the community as normal citizens made the job of search and identification more cumbersome in densely populated areas of Karachi.

- The army did not directly involve the local police department, which was better acquainted with the geography and the dynamics of the local populace.
- The army could not completely isolate the densely populated areas during their search operations, which gave the militants ample chance to escape.
- The army tried to counter the local influence of the MQM by creating another faction named MQM-Haqiqi; however, the idea backfired, and the violence between the two groups further deteriorated the security situation of the city, which was already in a fragile state.[30]
- Before the operation started, the government failed to realize how deeply MQM was connected to the different networks that run the daily systems of the megacity: labor unions, port organizations, industrial unions, student organizations, metropolitan organizations, and other small unions of the city. Through its networks, MQM disrupted the economic cycle of the city in retaliation for the army operation.[31]

After the termination of the army operation in Karachi, the militant group slowly gathered adherents and initiated activities again in

[30] Fazila-Yacoobali, "The Battlefields of Karachi."

[31] According to a report on conflict dynamics of Karachi by United States Institute of Peace, "Karachi accounts for more than 25 percent of Pakistan's gross domestic product (GDP), 54 percent of central government tax revenues, 70 percent of national income tax revenue, and 30 percent of industrial output. In 2007 Karachi's per capita output exceeded that of the country by 50 percent. Since Karachi generates 2 billion rupees (equivalent to $21 million) in daily tax revenues, the slightest disruption in the city's economic activities affects the national economy." See Huma Yusuf, "Conflict Dynamics In Karachi," *Peaceworks*, no. 82 (October 2012): 4. Due to the economic importance and global connectivity of Karachi and the daily loss to the economy due to the army operation, which was becoming untenable, the central government had to cease the operation, as they did not have much control over the city. Nichola Khan, *Mohajir Militancy in Pakistan: Violence and Transformation in the Karachi Conflict* (New York: Routledge, 2010), 8.

1994 and 1995, though this time with more assertiveness. According to a report by *Jane's Intelligence Review*, more than 400 of the officers who took part in operations against the MQM were subsequently murdered as retaliation.[32] The continuing violence against and victimization of the LEAs resulted in a devastating effect on their morale and efficiency, leading to the neglect of their regular policing functions. As the lawlessness and ethnic and religious violence remains a system problem in Karachi, the people remain hopeful and able to function within the system of the megacity and its networks. Many of the people in Karachi migrated from different parts of the country in search of a better life. Even though large amounts of residents live in slums, the hope of a better future for their next generation, which they expect in the construct of a megacity, keeps them motivated to support the functioning system despite all odds. That belief builds the resiliency of any megacity.

The megacity may not provide everything to everyone, but it does provide something for everyone. The resilient nature of Karachi remains the backbone of the economy of Pakistan and the hopes of millions of people connected to it. The government, however, remained negligent and deluded about the internal security situation of Karachi and did little to address the crime, targeted killings, gang fights, religious and ethnic militancy, politicization of the police, and corruption in local government bodies. All political and religious parties, along with government agencies, are equally responsible for the chaos in this megacity.[33] By 2006, this lack of control and lawlessness led to a bigger storm: the Talibanization of Karachi.[34]

The continuous operation of the Pakistan military against Tehrik-e-Taliban Pakistan (TTP), one of the largest and deadliest militant umbrella organizations, in the Swat District, Waziristan, and other ungoverned areas near the Afghan border, forced a large number of Pashtuns to take refuge in Pakistan's largest city in search of a liveli-

[32] "Breaking Apart—Militants and Gangs Fight for Control of Karachi," *Jane's Intelligence Review* (2014).
[33] Yusuf, "Conflict Dynamics in Karachi," 7.
[34] Alok Bansal, "The Ongoing Talibanization of Karachi," *Asia Pacific Bulletin*, no. 209 (2013).

hood.[35] However, this influx of refugees, which Karachi still receives, also included TTP members from the northern areas of Pakistan.[36] As the stage was set for them to continue their terrorist activities without much trouble in Karachi due to the ineffective LEAs, they took full advantage of the lawless and violent environment of the megacity. As the activities of TTP increased in the city from 2009 onward, the other ethnic militant groups also became the target of the TTP. The local police, who were used to crimes such as robbery, targeted killings, kidnappings, and shootouts between armed ethnic groups, were not alarmed by the initial activity of TTP. The other ethnic groups also blamed each other for the criminal activities. However, when TTP initiated major terrorist attacks and suicide bombings against disparate government organizations and LEAs, the government and other political parties became aware of the active threat of the presence of TTP in Karachi.

Until 2014, TTP had inflicted some major blows, which included attacks on military bases, law enforcement agencies, high profile politicians, and Karachi's Jinnah International Airport.[37] The growing influence of TTP and its activities in Karachi are now a significant concern for the government. With an already weak economy, Pakistan cannot afford the Talibanization of its economic hub. The ethnic diversity, densely populated areas, international connectivity, weak governance, poor law and order situation, and ethnic violence in the megacity offers the perfect hideout for the TTP terrorists to carry out their activities without being threatened or detected. However, the resilient nature of the megacity did not give TTP success in the mass mobilization of the people against the government based on their so-called jihad narrative.[38] Nonetheless, TTP did create fear among the masses and carried out its activities due to lack of governance and security in the city. The inspector general of Sindh Police reported the total strength of Karachi police at 32,524, out of which 12,000 are

[35] Declan Walsh and Zia ur-Rehman, "Taliban Terrorize Karachi as the New Gang in Town," *New York Times*, 29 March 2013, A1.
[36] Bansal, "The Ongoing Talibanization of Karachi."
[37] Azhar, "City at War."
[38] Waqar Ahmed, "TTP's Failures begin to Mount," *News International* (Karachi, Pakistan), 12 June 2017.

deployed for special security details, which leaves only 20,000 for policing almost 18 million people, or 1 police officer per 992 citizens.[39] No accurate estimate exists for the exact numbers of TTP in Karachi, but some sources hypothesize it is around 7,000.[40] The concern for the Pakistan Army, which is fighting against TTP in tribal areas, is the fundamental shift of tactics by TTP in Karachi, which previously used the city only for sanctuary or fundraising through different criminal activities, such as ransom and bank robbery.[41] However, now that the TTP has become emboldened and commenced more direct terrorist attacks on government organizations and personnel, the TTP has become a much greater concern for the Pakistan government and the army, which is also fighting the Taliban in the northwestern mountains of Pakistan.

Inferences

This case study of Karachi addresses the control dilemma for the difficult nature of control of megacities by governing authorities. As the trend of urbanization continues to increase rapidly in developing megacities, it will likely generate a conflict environment due to the lack of resources and the inability of governments to provide the basic facilities. The resilient nature of the megacity can generate support for its citizens, but this support ultimately weakens the span of government control in the shape of lawlessness, violence, and criminal activities. The trend can be seen in other developing megacities, such as Mumbai, India, and Lagos, Nigeria, where growing urbanization and ethnic violence has created a similar control dilemma for the governing authorities.[42] The worst part, however, is when a nonstate actor or a terrorist organization exploits the situation and makes it harder for the LEAs to operate against them in the dense, crowded, and connected environment of the megacity. With rapid urbanization and lack of

[39] Qaiser Zulfiqar, "Karachi Suo Moto: Verdict Out," *Express Tribune* (Karachi, Pakistan), 6 October 2011.
[40] Riffath Khaji, "The Karachi Taliban," *Peaceworks* (June 2014).
[41] Alex Rodriguez, "Taliban Finds Room to Hide in Karachi," *Los Angeles (CA) Times,* 2 March 2010; and Zia ur-Rehman and Amna Jamal, "Karachi Bank Heists Blamed on Militants," *Central Asia Online*, 17 December 2011.
[42] Inskeep, *Instant City*, 168.

control and the growing networks of terrorism, developing megacities will remain vulnerable to the nonstate actor or terrorist activities, as the construct of the megacity makes detection difficult and provides terrorists with global connectivity in a highly networked environment through illicit or licit networks. The likelihood of future intervention of the United States in a megacity may not be against a state but rather against a nonstate actor that is both connected and unconnected to the political and economic systems of the city government. Some important deductions from the case study in any such situation includes:

- The resilient nature of megacities will not help the terrorist mobilize masses. The same resilience can be used to fight against nonstate actors. The security of the community and its resources will be a key factor to repel the terrorist organizations from getting any support.
- The local police, and not the military of the host nation, remain the key players in the long-lasting fight against the militants within the megacity. The local police, who are more familiar with the local networks and organizations at street level, must be given more leverage and depoliticized before the start of any operation.
- The terrorists in megacities operate in smaller groups to avoid detection and direct confrontation. Thus, small and light forces are best suited to operate against the terrorists.
- Any operation requires a small team effort of intelligence, aviation, special operations forces (SOF), and local LEAs to operate against the target.
- The littoral connectivity of the megacities makes operations through a Marine Air-Ground Task Force (MAGTF) possible, without establishing a foothold in the host nation.
- The global connectivity and increased cooperation and information sharing of the police intelligence communities in megacities can increase the effectiveness of the LEAs against global terrorist organizations and build trust among them.

These lessons learned from Pakistan's Army operations leads

to the conclusion that the military cannot be successful in megacities with their traditional methods of urban warfare. This situation has further increased the importance of the local police department and exploring new warfighting concepts for megacities, given their special characteristics. The importance and role of police in antiterrorist operations will be discussed next, including the shortfalls in the local police departments of developing megacities, recommendations for basic changes, and a discussion of the latest trends in policing.

POLICING IN DEVELOPING MEGACITIES: AN ACHILLES HEEL

From problem framing and case study discussion, we can conclude that the complexities of megacities require a different approach toward warfare from traditional urban operational concepts. Furthermore, the continual growth of megacities in developing countries, such as Mumbai and Delhi, India; Karachi, Pakistan; Lagos, Nigeria; and Mexico City, Mexico, will likely create an environment of conflict due to limited resources. Such an environment can easily be exploited by local and transnational organizations of criminals, militants, terrorists, and drug cartels. In the construct of these megacities in a developing country, they can easily establish their illicit network while staying under the radar and remain globally connected. This operational concept aims to establish a framework for the megacities of developing countries to counter the threat emerging from nonstate actors.

The Threat Spectrum

The primary threat in a megacity likely emanates from nonstate actors, including ethnic militants, criminals, transnational terrorists, and drug cartels. These illicit organizations can slowly grow their influence over the functioning system of the megacities through networks. Operating within the networks, the nonstate actors avoid escalation of conflict to the level where the government might be forced to take decisive action against them, particularly if they have yet to achieve any strong influence within the functioning system of a megacity. Peter M. Haas likens their strategy to the often-repeated story of the boiling of the frog that is placed in cold water that is gradually heated. In this anal-

ogy, it is the gradual buildup of danger or discomfort by the nonstate actors that make it not as noticeable or threatening to the government until it is too late.[43] The recent examples from the Taliban's operation in Karachi, drug cartels in Mexico, and gang wars in Mumbai follow this analogy, which seems implicit in the kind of conflict that megacities, particularly in developing countries, may face in the near future.

The Approach

We may consider whether police should only perform rule-of-law policing to secure a community and attend to public grievances, or whether they should become a highly trained force to fight and act as a bulwark against terrorism by performing counterterrorist operations. Even Western nations have dealt with this issue for some time. But the reality is that the emerging threat of terrorism and the complexity of the megacity requires police to handle both tasks simultaneously.

Police capacity to fight terrorism and insurgencies remains critical. Many scholars have established that the police force is more effective than the military to perform this task.[44] Georgetown University's Christine Fair writes that "a police-led effort would be better than one led by the army, as the history of successful insurgency movements in disparate theatres across the globe shows."[45] Kalev I. Sepp's article "Best Practices in Counterinsurgency" also explains the centrality of the police role while describing the effectiveness of "Police in lead; military supporting," and the importance of a diversified and expanded police force.[46] To fight nonstate actors in the complex environment of megacities, this section develops an operating concept centered on policing efforts in concert with the military support of the host nation.

Some arguments for why the military should not lead counterterrorism efforts in a megacity include:

---

[43] Peter M. Haas, *Epistemic Communities, Constructivism, and International Environmental Politics* (New York: Routledge, 2016).

[44] Seth G. Jones and Martin C. Libicki, *How Terrorist Groups End: Lessons for Countering al Qa'ida* (Santa Monica, CA: Rand, 2008); and Kalev I. Sepp, "Best Practices in Counterinsurgency," *Military Review* (May–June 2005): 8–12.

[45] C. Christine Fair, "Policing Pakistan," *Wall Street Journal Asia*, 30 June 2009.

[46] Sepp, "Best Practices in Counterinsurgency," 8–12.

- Military operations in a megacity can disrupt the flow of the system, which can adversely affect economic activity and inflict heavy financial losses on the government, civilians, and businesses.
- The military has a larger physical footprint and centralized forces, which creates issues maneuvering forces through the dense population and the loss of surprise and speed. Conversely, terrorists operate through networks with a very small footprint. The shelf life of the intelligence in the megacity environment is very short, requiring immediate responses.
- Military operations have an inherent risk of immense collateral damage given the sheer mass of the city and its population.
- The traditional methods of cordon and search are rendered almost impossible in the dense environment of the megacity. Surge operations in urban areas have mostly proven counterproductive as a result.
- Limited relationships with the local community and knowledge of local conditions can affect the military's intelligence operations.
- The military is more focused on countering the terrorist than securing the populace and its resources.
- The military offers a short-term solution. The long-term deployment of military forces in a megacity will degrade their conventional warfighting skills. The situation creates frustration among the troops, which may result in mistreatment of the populace by military personnel, further exacerbating the situation for the government.

The Importance of Policing a Population

Analyzing the disadvantages of military operations in a megacity, the policing option seems most suitable. The police forces are more decentralized than the military and better connected to the community. As members of the same community, police have a better intelligence network at the local level. Police also are more inclined to protect the

community and its resources. They can play a more significant role in exploiting the resiliency of a megacity with their local knowledge and networks within the community, using the NGOs and their networks to guide their efforts effectively. Police from most megacities in developing countries are organized and trained to deal with common criminals and law enforcement. However, the complexities in the megacity environment and the emerging transnational terrorist threats require militarization and mass transformation in the capability of the police force.

Most of the police forces in megacities of developing countries require modernization. Some basic problems, such as a lack of resources, technology, and manpower are made even worse due to corruption and politicization, which are common in the police forces of these areas.

Therefore, it is important to analyze some of the basic problems and capability shortfalls that have caused the police failures. Based on the case study and research work done on the problems of combating terrorism in Karachi, this section explores the fault lines in the city's policing system. This analysis will help us understand what needs to be done and formulate the way forward to reform the police in megacities. This process also provides some insight to American counterparts about some of the problems in developing countries with regard to the police department. The Karachi Metropolitan Police (KMP) will be discussed as a case study. The problems of KMP have many similarities with those of the Mumbai, Lagos, and Mexico City police.

Historical Factor

Policing in many developing countries was introduced during colonial rule. The major purpose of police in the colonies was to coerce and control the local populations. Police infrastructure inherited by both Pakistan and India was established during the British Raj, or British Indian Empire, as the Police Act, 1861.[47] Instead of using the London

[47] Srikanta Ghosh and K. F. Rustamji, eds., "Medieval India, East India Company and British India," in *Encyclopaedia of Police in India* (New Delhi: Ashish Publication House, 1993), 16–45; and The Police Act, 1861: An Act for the Regulation of Police, Act V of 1861 (1861).

model of policing, the British introduced the Irish model of policing.[48] The purpose of this police force was not to enforce the rule of law but to enforce the law of the ruler. Rule of law systems function as "transparent systems of making laws and . . . [enforcing] laws that are applied predictably and uniformly. Openness and transparency are essential."[49] In the law of the ruler system, however, police remain loyal to the rulers instead of the state. This model provided an authoritarian and unaccountable police force. Unfortunately, both India and Pakistan inherited the same model, and it continued in Karachi until 2002. Politicians continued to use the police force the way it was used during the British Raj, which created a lack of confidence in the police by the public, compounded by corruption and inefficiency in the police department. In 2002, new reforms were introduced; however, the general mind-set within the police department and the government remained the same, illustrating the elusiveness of long-lasting and effective solutions to this problem.

Problems and Shortfalls

The primary by-products of the politicization of the police are corruption and inefficiency. Employment with the Karachi police force is based primarily on political affiliation. The senior police officers are not promoted on the basis of merit, but on their affiliation with the ruling political party.

Police stations in Karachi are divided according to the geographic areas they cover, not based on population. In Karachi, 330,000 police personnel are placed in 113 police stations.[50] This method may be effective in rural areas, where the population is more evenly distributed, while in Karachi, the population density varies across a large spectrum. The overall police population ratio is also low; out of 33,000 police personnel, approximately 12,000 are employed on different administrative, protocol, and VIP escort duties, leaving a city of almost 18

[48] David Arnold, "The Police and Colonial Control in South India," *Social Scientist* 4, no. 12 (1976): 3–16, https://doi.org/10.2307/3516332.
[49] *Part I: What Is the Rule of Law?* (Chicago: American Bar Association for Public Education, n.d.), 5.
[50] "Policing Karachi," *Dawn News*, 23 February 2014.

million people with a law enforcement ratio of 950:1.[51] In comparison, the overall police force ratio of Pakistan stands at 1,000:2.[52]

Today's police force lacks resources and funding, which in turn affects their capability to implement law and order; the military receives a majority of the resources and a large percentage of the federal budget. In Pakistan, approximately 18–20 percent of the federal budget goes to the military, whereas Sindh Police, which is part of the Sindh provincial government, only sees 8 percent of the total provincial budget.[53] KMP receives 1 percent of the overall Sindh budget. Police personnel are severely underpaid and see few incentives or promotions. Their monthly pay amounts to about U.S. $100, and their duty hours often exceed 14 hours a day.[54] These issues may be the basis for increased corruption and lack of motivation in KMP.

The major problem in most of the megacities is that the provincial and city governments fail to realize that, with the present threat, the police force needs to earn the trust of the public and modernize on all fronts to counter the threat of instability and violence in the megacity. Police forces who have been successful were organized to counter low-level crimes in rural and basic urban settings. With the advancement in technology, the tactics employed by the criminals have changed. The police, however, did not adopt these changes; as a result, the criminals have gained a strategic advantage with their new tactics as the police have been unable to adapt to the rapidly changing environment. The ethnically based militancy and terrorism in Karachi skewed beyond the capacity of the police to handle.

Military dominance in developing countries is another major hindrance in the modernization of the police force. According to the current Pakistani philosophy, the military can do everything, whether it is through conventional warfare, counterterrorism, or disaster relief

[51] Qaiser Zulfiqar, "Karachi Suo Moto: Verdict Out," *Express Tribune* (Karachi, Pakistan), 6 October 2011.
[52] Hassan Abbaas, *Reforming Pakistan's Police and Law Enforcement Infrastructure: Is It too Flawed to Fix?* (Washington, DC: United States Institute of Peace, 2011).
[53] Ankit Panda, "Pakistan Expands Defense Budget," *Diplomat*, 12 June 2014; and *Budget Analysis, 2014–15* (Karachi, Pakistan: Finance Department, Government of Sindh, 2015).
[54] Hassan Abbas, *Role of Pakistan Police in Counterinsurgency* (Washington, DC: Brookings, 2009).

operations. At the time, the police position and role in the megacity was not understood or utilized. The overreliance on the military undermined the importance of the police force, and it was never able to reach beyond the status of the national military service. Counterterrorism issues and operations are primarily dealt with by the army, and the police force had not been part of the plan. What Pakistani governments failed to realize is that the military can operate in the northwestern mountains of the country, where they can evacuate the districts and villages for operations against the Taliban; however, the military cannot operate with the same strategic mind-set in the megacity of Karachi against terrorist networks.

Lack of technology represents the most significant failing of the KMP. Prior to 2000, Pakistan's police departments barely had access to a forensic laboratory; to date, each province houses a single forensic office.[55] Poor data collection and matching capability resulted in lost records and inaccurate movement of criminals. The KMP lack basic electronic intelligence, surveillance, and reconnaissance capabilities, which has restricted them to relying on human intelligence only. Insufficient and old communication equipment also placed limits on operational capabilities.

Lack of coordination appears to be the most significant issue between all forms of government LEAs in Pakistan, resulting in a disconnect between KMP and other law enforcement agencies. Military forces and intelligence agencies neither trust the police nor share intelligence information with them. For example, if a police constable wants to trace the call records of any individual, they must first send an official request to the intelligence agencies. The organization houses 20 different LEAs working under a federal government (figure 1.1).[56] These organizations rarely coordinate or share their operations. With the exception of other provincial police organizations, almost all others have a presence in Karachi, but no central authority coordinates the counterterrorism efforts in the city. Although counterterrorism is being addressed through a whole-of-government approach, the army

[55] Abbaas, *Reforming Pakistan's Police and Law Enforcement Infrastructure*.
[56] Abbaas, *Reforming Pakistan's Police and Law Enforcement Infrastructure*.

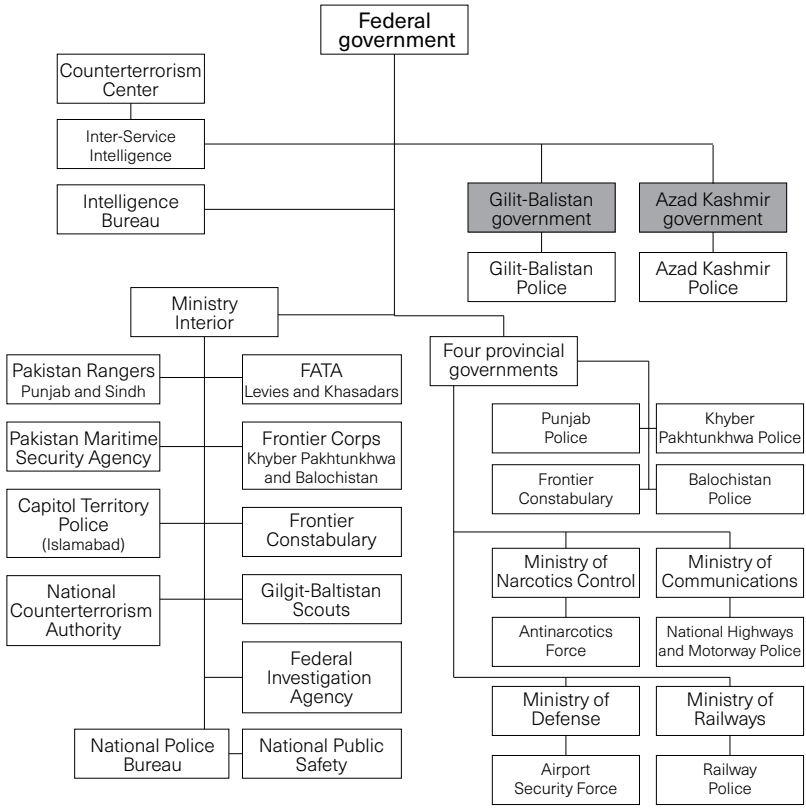


Figure 1.1 Organization chart of Pakistan's central government.
Illustration by MCUP

is the main organization fighting the menace. All the resources and intelligence go to the army, which is one reason why the police never operate in Karachi at full capacity.

Differentiating between a terrorist, a militant, and a trained criminal in Karachi remains a real issue when each is tightly connected through a network. Many legitimate organizations are connected to the illicit ones, and they all operate within the spectrum of the megacity. Unfortunately, this structure lies beyond the capacity of the metropolitan police to separate and operate. The army is heavily engaged in the operations against the Taliban in the northwestern parts

of the country and also is deployed on the eastern borders. They are not ready or prepared to operate in Karachi, which is clear in the lack of strategy by the government to combat terrorism in Karachi, where more than 13,000 people died from terrorist incidents in the last five years.[57]

The sole purpose of analyzing the case of Karachi is to explain the reasons for the failure of the government to implement law and order and counterterrorism. Most of the megacities in developing countries are suffering the same fate. For example, during the terrorist attack on Mumbai in September 2008, Mumbai police failed to prevent the attack or control the situation during the attack.[58] In many instances, governments in developing countries have overrelied on military operations and undermined the importance of police in the megacities. The reform of the New York Police Department (NYPD) after the attacks on 11 September 2001 serves as a perfect example of transformation for a police force to tackle the modern-day security threats that are unique to megacities due to their complexity. The NYPD made revolutionary changes in training, capability, interagency coordination, foreign partnership, intelligence gathering, and field operations.

Basic Reforms and New Policing Concepts

To fight counterterrorism in the megacity, the KMP needs revolutionary changes. Some of the problems are very basic, but the police force needs advanced training and innovative skills. The mind-set and culture of the police force needs to change. The colonial-era mentality, where police served the ruler and their efforts to control and coerce the people, needs to be replaced with the philosophy of the police as a service rather than a force, which would develop trust by the local community.

Police personnel salary must be increased to motivate the indi-

[57] Rabia Ali, "Death Toll Rises: Over 3,200 Killings in Karachi Make 2013 Deadliest Year so Far," *Express Tribune* (Karachi, Pakistan), 18 January 2014; and "78 Children among 2,909 People Killed in Karachi: HRCP," *Dawn*, 7 January 2015.

[58] Arundhati Roy, "The Monster in the Mirror," *Guardian*, 12 December 2008.

vidual and to reduce corruption at an individual level. A merit-based induction and promotion system rather than political affiliation would also improve the current standard of police advancement.

Community-based policing is another important area that requires evaluation. This concept ensures that the community is part of the solution rather than the problem, which could play a vital role in exploiting the resiliency of the megacity. Community-based policing also builds relationships in the community, providing intelligence networks within the community. Most of the personnel in the KMP, however, are not from the city. The junior officers typically come from the rural parts of Sindh due to the quota system that currently supersedes merit-based selection. To support the community-based policing concept, recruitment must take place in the local community.

The police require extensive modernization and enhancement of their capabilities in everything from weapons to intelligence, surveillance, and reconnaissance (ISR) equipment. KMP's present ISR capability is restricted to human intelligence. Otherwise, the department depends on the Inter-Services Intelligence (ISI) headquartered in Islamabad, Pakistan, and the Intelligence Bureau (IB), headquartered in New Delhi, India, for ISR. Police personnel also need to upgrade their basic communication equipment and systems. Communication scanners, jammers, and secure wireless communications must be installed at all police stations.

The KMP must participate in progressive training to learn modern tactics, training, and procedures (TTPs). They should send officers for training with world-renowned police forces, such as those in NYPD and London's Metropolitan Police (a.k.a. Scotland Yard). The Pakistan Army can support training on basic urban warfare tactics. The main purpose is not to train only special or elite forces but to increase the skill level of the entire police force.

The interoperability of Karachi police with other LEAs remains paramount to achieving success in the complex environment of the megacity. This includes sharing information and coordinating collaborative operations, but the government must also understand that the army cannot solve the issue alone. It has to assign responsibilities to the police, especially in cities such as Karachi. A joint operation center

should be available to share information and coordinate counterterrorist operations.

The KMP needs to organize based on the size of the population rather than the size of the area. To cover the population of Karachi, police forces should improve their ratio from 900:1 to 400:1, which is a basic United Nations (UN) requirement to maintain law-and-order. If this is the case, Karachi needs almost twice the size of the present force strength for effective counterterrorism activity. In a counterinsurgency scenario, Bruce Hoffman suggests the ideal police-to-population ratio of 1,000:20.[59]

The police stations represent the smallest independent unit of the force. Their area of responsibility is marked geographically, and they do not operate outside their area of jurisdiction, creating an inflexible organization during operations. With the latest human terrain mapping concept, the city can be divided virtually on the basis of such factors as grievances, ethnicity, or religious affiliations. Those virtual boundaries can be allocated to different teams for operations, irrespective of geographical boundaries. Multiple social media sources can map the city according to different factors.

With some basic modernization, developing countries can apply some of the new trends in policing that have been adopted by some of the Western megacities. These trends support better strategies against terrorism and nonstate actors.

Predictive Policing

Coined in 2009 by the National Institute of Justice, the term *predictive policing* refers to gathering data from disparate sources and analyzing them. The results will then be used to anticipate and prevent future crimes and respond more effectively as they happen in real time.[60] For example, in 2012, the New Orleans Police Department and data-

[59] For more on these concepts, see *Promoting Health, Security, and Justice: Cutting the Threads of Drugs, Crime, and Terrorism, 2010 Annual Report* (Vienna, Austria: UN Office on Drugs and Crime, 2010); and Bruce Hoffman, *Insurgency and Counterinsurgency in Iraq* (Washington, DC: Rand, 2004).

[60] Beth Pearsall, "Predictive Policing: The Future of Law Enforcement?," *NIJ Journal,* no. 266 (2010): 16–19.

mining company Palantir partnered to deploy a predictive policing system in the city in the hopes of combating New Orleans's staggering crime rates.[61]

Hot Spots Policing

The concept of hot spots policing shifts the paradigm of crime control from personnel to places. David Weisburd, director of the Center for Evidence-Based Crime Policy at George Mason University, explains that most crimes are concentrated in specific urban areas.[62] Plotting crime locations can show the hot spots where most of the crimes are committed. Based on those hot spots, random patrols can be directed to high-risk areas to decrease crime rates. While somewhat similar to predictive policing, the focus here shifts to where the crimes occur.

Community Policing

The concept of community policing promotes the systematic use of partnerships to proactively mitigate the risks of crime or social disorder due to certain conditions. Neighborhood Watch is a community crime-prevention program in the United States and the United Kingdom (UK), where residents and businesses in neighborhoods reduce crime by looking out for suspicious activity and reporting it to the police. It is based on the idea that residents of the neighborhood serve as the eyes and ears of the police, which might discourage criminals if they are aware that local residents are willing to report suspicious behavior or activity.[63]

Social Media

Several police departments use social media effectively to convey their message and gather information to prevent crime. The Los An-

[61] Ali Winston, "Palantir Has Secretly Been Using New Orleans to Test Its Predictive Policing Technology," *Verge*, 27 February 2018.
[62] David Weisburd, *Future Trends in Policing* (Washington, DC: Office of Community Oriented Policing Services, Police Executive Research Forum, 2014).
[63] T. Bennett et al., *The Effectiveness of Neighborhood Watch* (Oslo: Campbell Collaboration, 2008), 18.

geles Police Department (LAPD) integrated a social media branch in its structure to brief the incident commander about activities in the region. LAPD also surveils large social gatherings and adjusts its daily deployment accordingly.[64] In a 2008 Mumbai attack, the terrorists were updated by their handlers about the movement of security forces from updates on social media.[65]

To fight against terrorists in a megacity, it is imperative to enhance the ability and capacity of the police department to gain any kind of result. The military alone cannot take the burden of policing in an insurgency. To fight against the criminal networks, both police and military forces should complement the other's capabilities. The next portion of this chapter will establish a combined police-military operational concept to counter terrorists and criminals.

OPERATIONAL CONCEPT: HYBRID POLICE–MILITARY APPROACH

The complexity of fighting wars in urban areas is not new; even Sun Tzu noted that attacking cities is the worst wartime policy.[66] Densely populated areas with high connectivity and productivity make it more difficult for the operating forces to apply traditional methods of warfighting in megacities. The rapid growth of urbanization in developing countries with a significant lack of resources creates governance and law-and-order issues, which in turn provide illicit organizations an opportunity to operate in the megacity construct without constraint. The transnational terrorist and criminal organizations that used to operate from remote areas are much more comfortable and safer in megacities, whose density provides them cover. The lack of governance gives them the opportunity to merge with the local economy to raise money, and the highly connected environment provides them networks to operate globally. The global interconnectivity of the terrorist and criminal organizations are becoming a major concern for the international

[64] Weisburd, *Future Trends in Policing*.
[65] *Mumbai Attack Analysis* (New York: NYPD Intelligence Division, 2008), 42–54.
[66] Sun Tzu, *Art of War*, trans. Samuel B. Griffith (New York: Oxford University Press, 1963), 78.

community. The military forces operating against illicit organizations in the megacities find it difficult to counter these organizations using basic urban warfare concepts.

Purpose

The concept of the police and military working together gives a framework of how the military—in support of the metropolitan police—can be task organized to fight in the megacity with a minimum footprint and disruption in the city and to establish networks to counter growing terrorist networks. This concept mainly revolves around police-military hybrid operations. It is important to note how police can take the lead generating intelligence-based targeted operations against nonstate actors in quick and efficient ways, without damaging the infrastructure and economy of the megacity, based on enhanced capability and military support.

The concept of joint police-military operations may not work in all circumstances, primarily because of the varied conditions in different countries. As in most developing countries, the military has very little role to play concerning civilian matters within the country and no single agency is responsible for antiterrorist operations within the country. Nevertheless, in many developing countries, the military is responsible for internal security, mainly because of the lack of capability of the police department. For example, Pakistan and Mexico's militaries play a vital role in operations fighting criminal elements. In such cases, these militaries may be ready to collaborate with the police; however, the larger part of this chapter's argument contends that they need to raise the level of police capability because these militaries cannot fight alone in the megacities. While the military in megacities may achieve temporary success against the nonstate actors, the ultimate fate of the insurgency will be decided by the performance of police due to the longer nature of such wars.

Assumptions and Risks

After carrying out the literature review and case study on the megacity, the concept of operations has been developed based on the following assumptions:

- The resilient nature of megacities may deny support to the terrorists. The same situation can be exploited by LEAs in favor of operating forces.
- The likelihood of a full-spectrum war against a state in a megacity remains remote due to the national and regional importance of the city; however, the possibility of operations against terrorist and criminal organizations continues to increase.
- To counter terrorist networks, LEAs have to operate within and through these networks, which will increase their speed and flexibility.
- The capability and the responsibility of the police and military forces must overlap on many domains while operating against terrorists or criminals in a megacity. Police, being more familiar with the local networks and community, represent the better option to operate within a megacity against terrorists.
- For the purpose of this concept, we assume that police in a developing megacity have upgraded their surveillance and intelligence capabilities, with requisite manpower and weapons.

Military Problem

Megacities pose a significant challenge for future military operations. The issues of operating in a megacity do not originate solely from its massive, dense urban setting, but also its highly networked and fluid environment. The high speed and flow of information will create a challenge for intelligence operations. The dense and connected environment will be a dilemma for maneuver, which may need to be carried out on all three planes: land, air, and space (cyber). As the enemy operates in networks, maneuvers will now be made on those networks to capture the terrorists. The concept of control, contain, and isolate may appear obsolete in a population of 20 million people connected by thousands of internal and external networks. Important tactical grounds (ITGs) may not lie in the physical plane, but rather at the nodal convergence of different networks, communication centers, and ener-

gy and food resources. The effects of disruption within the economic system of a megacity can resonate nationally and globally.

The terrorist and criminal organizations are effectively using the high density and connectivity of the megacities to coordinate and operate in hundreds of networks, while security forces are bound by physical areas of operation and beholden to fixed response time lines to operate against those illicit networks within very brief windows of time. The military requires an operating concept that gives them flexibility and mobility to operate in support of police forces in megacities through networks and multidomain capable task forces, such as enhanced company operations (ECO) with combined arms, air, logistics, and SOF elements, which can be expanded to personnel from all the branches of service and interagency organizations under one roof.

Synopsis

This concept of operations revolves around two concepts. First, we must rely on the resilient nature of the megacity to deny any support from the community for the terrorists and criminals, but instead to the advantage of the operating forces, including the involvement of local police forces as part of setting up the network. The growing threat of terrorism in a megacity may be best dealt with by the local police rather than the host nation or foreign military due to their inherent knowledge of the area and the local networks. By developing the capability of the police forces in megacities, especially in developing countries, and by uniting them in a network to fight against the global terrorist and criminal networks, they can better prepare for future threats. This network could share intelligence, develop common operating procedures, and establish trust among agencies. These networks also can work to benefit the operating force tasked with fighting the terrorists or providing humanitarian aid in the megacity.

Second, the task organization of the military force must be accomplished to support policing operations in the most flexible and swift manner. After analyzing the complexities of megacities and the problems of a conventional military force in the dense urban environment, particularly the second- and third-order effects of its operations,

the most suitable option may be the ECOs developed in 2008 by the Marine Corps Warfighting Laboratory.[67] The purpose of ECO, as explained by General James T. Conway, is "an approach to the operational art that maximizes the tactical flexibility offered by true decentralized mission accomplishment, consistent with the commander's intent and facilitated by improved command and control, intelligence, logistics, and fires capabilities."[68] ECOs give an infantry company the arms capability to operate independently of its battalion.

The ECO in this operational concept is used more as a theory than a model. For the purposes of our discussion, ECOs serve as a military force small enough to offer a minimum footprint inside a megacity, but large enough to support multidomain capability from combined arms for independent operations. ECOs represent a prime example for conventional militaries, such as the Pakistan Army, that still have to learn the art of decentralized operations with small teams, especially in Karachi. The smallest organization with combined arms capability in the Pakistan Army is the Independent Infantry Brigade, which is still a large force to operate in a megacity. The essence of the ECO-type small unit success relies not on the number of troops, but on the variety of capabilities across multidimensions. Depending on the situation, whether fighting a counterinsurgency in a megacity or performing a humanitarian aid mission, the ECO can provide a good platform for all the services, including interagencies, intelligence agencies, and special forces to function collaboratively. Connecting these entities who play a role in the battlespace at much smaller levels supports more cohesion and unity of effort and will save time from vertical coordinations. The multifaceted capability of this type of unit will help forces react swiftly to the identification and elimination of the enemy networks without disturbing the city system. This ECO concept

[67] Col Vincent J. Goulding Jr., USMC (Ret), "Do: More than Two Words," *Marine Corps Gazette* 92, no. 4 (April 2008): 77–78; and Col Vincent J. Goulding Jr., USMC (Ret), "Enhanced Company Operations in High Intensity Combat: Can Preparation for Irregular War Enhance Capabilities for High Intensity Combat?" (master's diss., Marine Corps University, Command and Staff College, 2009), 18–19.

[68] James T. Conway, "A Concept for Enhanced Company Operations," *Marine Corps Gazette* 92, no. 12 (December 2008): 57–58.

can also generate a quick humanitarian aid response with the help of host nation forces.

The most important piece of the concept is how the ECO military unit works in collaboration with the police, whereby both forces complement the other's efforts and capabilities. Collaboration ensures the security of the community and their resources in the megacity, further building the relationship between the operating forces and the community and exploiting the positive resiliency of the megacity for the advantage of the forces operating in the city.

APPLICATION AND INTEGRATION OF MILITARY FUNCTIONS

Command and Control

The concept of command and control is not much different to the mission-command philosophy or centralized command and decentralized control. As defined by the Department of Defense (DOD), the term *command and control* refers to the authority of a commander over forces to accomplish a mission.[69] The control piece, however, makes the difference. The fusion of the police network with the military is the most critical part of command and control. The overall command of the operations will be controlled by the highest city department official assisted by a senior military advisor and city police chief. The relationship between the police and the military will work like a mutually beneficial relationship.

The initial phase of the operation—phase 0 or in phase 1 of police operations—can be supported by the military to establish networks and to enhance battlefield awareness and intelligence gathering. In phase 2 or 3, which is more kinetic in nature, the military will be supported by the police in active targeting of the criminals. In phase 4, which serves as more of a stability phase, the military will act in a supporting role to the police (figure 1.2).

A combined operations center of police and military staff, along with the staff from city government, will support all the requirements

[69] *Department of Defense Dictionary of Military and Association Terms*, Joint Publication 1-02 (Washington, DC: Joint Chiefs of Staff, 2010), 47, hereafter *DOD Dictionary*.

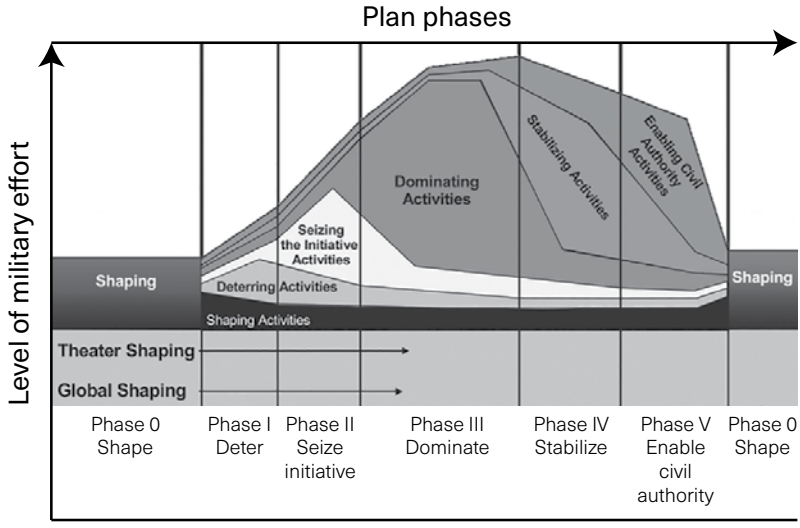


Figure 1.2 Notional operation plan phases.
Illustration by MCUP

of field operating forces. The city can be divided into four to six sectors, with each sector having their own police operations center. Each sector can be allotted an independent ECO from the military forces. The subsequent subsectors of the police can be assisted by the platoons and squads from the ECO, but they will only be divided once required. It is important that, while operating through multiple networks in the megacity, small groups be given much more leverage to operate swiftly and independently. Depending on the situation, each independent company can be provided with representatives from the State Department, U.S. Agency for International Development (USAID), intelligence departments, air elements, and SOF teams. The ECO can operate within the battalion framework and directly report to the Marine Expeditionary Unit (MEU) commander or geographic combatant commander (GCC).

Intelligence

Intelligence remains the centerpiece of this concept. The entire con-

cept of megacity warfighting hinges on intelligence operations. Intelligence operations are not only important to locate enemy networks but also to identify the strengths and weaknesses of the society and to establish friendly networks. The accuracy of the intelligence also plays a vital part in ensuring minimum destruction and disruption in the megacity. Intelligence and operations are complementary to the functionality of the process. David Kilcullen describes the relationship between maneuver and intelligence as:

> Your operations will be intelligence driven, but intelligence will come mostly from your own operations, not as a "product" prepared and served up by higher headquarters. So you must organize for intelligence. You will need a company S2 [intelligence] and intelligence section.[70]

The notion of winning a war in the megacity is directly dependent on the success of intelligence operations. Intelligence operations combine services and interagency operations that require a wide and dynamic range of intelligence resources, from satellites to human intelligence and open source social media, all at the discretion of the independent company commanders reinforcing the intelligence-gathering efforts of the police network in the megacity. Police intelligence will come from human intelligence resources through the local community network. Some of the latest trends in policing, such as community and hot spot policing, build the network further.

Maneuver

Maneuver in the megacity is mostly done through the primary nodes of the different networks, which may lie in both physical and spatial planes.[71] *Nodes* refer to the intersection of different networks created by a person, organization, or an ideology. Policing operations can be

[70] LtCol David Kilcullen, Australian Army, "Twenty-Eight Articles," *Marine Corps Gazette* 91, no. 10 (October 2007): 53.

[71] For the purposes of our discussion, *maneuver* refers to the "employment of forces in the operational area through movement in combination with fires to achieve a position of advantage in respect to the enemy." *DOD Dictionary*, 168.

effective to catch the terrorists and criminals operating and interacting through different social networks.

The main components of maneuver are the combined small local subsector police teams and squad-level military teams functioning under independent companies allocated to each sector. The squad-level teams under an ECO will mainly deploy on the concept of distributed operations (DO). DO refers to a form of maneuver where highly capable small unit teams are distributed across a large area of operations to achieve an advantage over the enemy through separate but coordinated tactical actions. The independent company will rely both on aerial and ground assets. These teams will travel light and move quick. Predictive analysis, crime mapping, and hot spot policing are but some of the methods to facilitate police force maneuvers. Each police station or subsector will have small, light, and well-trained quick reaction forces that will partner with the small military operation teams. An important factor of the maneuver is the ways the police can use social media networks, local partnerships with business communities, and other NGOs to support and mobilize the masses for both counterterrorism operations and relief operations.

Fires

Fires in a megacity require more precision than mass. In this instance, the term *fires* refers to using weapon systems to create specific lethal or nonlethal effects on a target.[72] Terrorist groups typically operate in smaller units within the population centers. Smaller teams operating against them may not need heavy fire support, but what they will require is timely support given that their window of opportunity will be brief. Traditional fires from indirect weapons may not be effective in the megacity; thus, unorthodox fire capability through drones, camcopters, and micro air vehicles will work as a force multiplier for the small units.[73] The fires will be coordinated at sector and company level.

[72] *DOD Dictionary*, 100.

[73] Drones, micro air vehicles, and camera or quadcopters are all considered unmanned aerial vehicles (UAV). See "Quadcopter vs. Drones: What's the Difference?," Fortress UAV, 16 January 2018; and "Micro Air Vehicles," AVID.com.

Force Protection

Force protection success depends on a small footprint of collateral damage, minimal disruption to the community, and community support. In this situation, *force protection* refers to the preventive measures a police or military force takes to mitigate hostile acts.[74] The military units will neither perform the patrols nor man the checkpoints, ensuring minimum exposure. They will mostly assist in targeted operations or humanitarian aid missions.

Networking

Networking in classical warfare is part of the intelligence process, but because of its overall importance in this operational concept, we will discuss it as a separate warfighting function. The purpose of networking is to defeat the enemy's system, while converting the military structure into a flexible empowered web. Networking will allow forces to disseminate information faster, supporting quick decision making and action. Distributing small teams in a large area under the ECO builds that network. Networking is much more than a medium to exchang data; it leverages cultural and physical proximity, develops relationships based on trust, and contributes to the decision-making process. The police-military hybrid approach in a megacity bridges the gap between the community and security forces and builds networks to defeat and disrupt terrorist networks.

Necessary Capabilities

The necessary capabilities required to fight a war in the megacity may not be altogether different from combat in urban areas or in counterinsurgency operations. They do differ, however, in how they are organized and employed in the megacity. The independent military companies functioning on the lines of an ECO will require combined arms capabilities, logistics elements, intelligence and air assets, SOF teams, and personnel trained for security partnerships. The force also should be capable of employing the latest ISR available to the military. The capability of police in most developing megacities needs

[74] *DOD Dictionary*, 105.

enhancement from traditional to contemporary policing methods. ISR platforms, communication equipment, mobility assets, and enhanced combat training represent the most significant needs.

CONCLUSION

The future operating environment will bring multiple challenges for military forces. No single solution will apply to all battlespaces, reinforcing the need for continually evolving operating concepts. Megacities in developing countries will pose a unique challenge to their militaries, though not necessarily from the enemy but from its own peculiar and complex environment that renders traditional warfighting concepts ineffective and requires innovative thinking for multiple solutions. The concept of enhanced company operations within the hybrid police-military model of operations in the megacity represents an effort to move in the same direction. The concept exists at a very nascent stage in its development, and employment requires further deliberation within civilian and military agencies responsible for local security. However, the basic framework exists, which should serve as fodder for new developments for the future of urban combat in the megacity environment.

CHAPTER TWO

Territorialization of the Megacity

Exploiting Social Borders

Major Alexandra V. Gerbracht, U.S. Marine Corps

On 18 March 2018, police in Sacramento, California, shot an unarmed black man 20 times in his backyard. Officers claim to have been responding to calls of suspicious activities related to vehicle burglaries in the area. Without identifying themselves, they entered Stephon Clark's property, fatally shooting a man holding only a cell phone and failing to render aid for more than five minutes after he collapsed. Mass protests erupted across the city in the midst of local and national debates on gun laws and police brutality.[1]

INTRODUCTION

Within a megacity, grievances exist, stemming from social anxiety that accumulates over months and years. These grievances translate into a heated national argument while marginalized sectors of the population wait to address their grievances. Then, an event sets off the frustrated masses of a densely populated area; crisis and chaos become quickly amplified in a densely populated area. However, through preparation and understanding the social map, coupled with the fore-

[1] Sam Levin, " 'They Executed Him': Police Killing of Stephon Clark Leaves Family Shattered," *Guardian*, 27 March 2018; and Jose A. Del Real, "Hundreds at Sacramento City Hall Protest Police Killing of Stephon Clark," *New York Times*, 27 March 2018.

sight to draw boundaries, a national security apparatus can limit the impact of a potentially costly uprising.

Megacities are defined by their dense populations, networks, resources, and life-support systems. As such, influencing possible security events—threats—by defining territories of informal social and economic similarities and civil structures, and identifying grievances is a challenge. How are megacity conflicts that arise from collective behavior limited? Government influence must limit turmoil by identifying and protecting targets, while also enabling mobility of the populace. In addition, physical constraints, grievances, and collective behavior in a megacity define territories, which affect the dynamics of a crowd and identify targets of collective violence. Mapping these informal networks within a dense environment allows maneuver around and through crisis areas; and understanding grievances allows for target identification and protection. Thus, when governments see and identify high-risk enclaves, they can limit the impact of a crisis.

Megacities foster territorial collective behavior that reflects both political and economic grievances.[2] Existing physical constraints limit and define the behavior, though collective behavior and group dynamics can develop into collective violence. Violent actions, such as riots, result in rational targets, which stem from grievances within the population. As a result, transient masses and belligerent actions combine to form the collective behavior that defines the boundaries of a crisis. By understanding group formation and grievance development within a densely populated area, state agencies can more effectively identify areas of risk. Exploiting the nature of these territories may in fact limit the impact of conflict and increase the influence of the state. Identifying the targets of collective violence and their territorial boundaries creates mobility corridors and supports state forces with maneuver space to set up logistical operations, blocking forces, channels for the enemy, and humanitarian relief.[3]

This chapter links territory-based collective violence with a forc-

[2] For the purpose of this chapter, *territories* are networks associated in time and space, the physical boundaries of a group of people, places, and/or things.

[3] Collective violence generally falls into three categories: situational (e.g., barroom fight), organized (e.g., lynching), and institutional (e.g., the national guard policing a riot).

es' ability to exploit maneuver space and define targets. The research applies to physical and nonphysical targets across international borders. Territoriality is not restricted to the megacity geography of dense human populations. To combat an unconventional enemy, formal networks must influence the informal ones that define the territories. Collective behavior is by definition an informal network. When collective behavior evolves into a crisis, state forces must limit the collective violence by mapping and estimating targets. Based on the 1992 Los Angeles and 2005–6 Paris riots, the following case study will look closely at collective behavior, existing territories, transient mass generation, security responses, and targets to develop a concept for defining territories of collective behavior threats and exploiting boundaries to increase state influence and to protect targets. Identifying key territories and targets prior to, or at the onset, of a conflict in a densely populated environment will shorten that conflict and reduce the amount of collateral damage.

COLLECTIVE BEHAVIOR

The basis of this research revolves around several key definitions that link progression from grievances and collective behavior to territorialization. The linkages are broad and derive from a variety of factors. Understanding the process and theories behind the social actions of collective behavior through transient mass to collective violence may clarify the creation of territories.

Grievances

We must first focus on the concepts of political and economic grievances. These complaints develop in megacities through the marginalization of certain ethnicities and economic classes and the limited opportunities available to them.[4] There is a large body of work in the political economy and sociology fields comparing greed versus grievance as a motivation for conflict. Self-enrichment incentives serve as motivation to continue conflict, including access to resources, and

[4] Karen Ballentine and Heiko Nitzschke, *Beyond Greed and Grievance: Policy Lessons from Studies in the Political Economy of Armed Conflict* (New York: International Peace Academy, 2003).

also as a form of greed.[5] The intent of this study is to look at horizontal inequality grievances, or those among culturally defined groups that amplify the potential for conflict, to identify the territories created by grievance. These grievances relate to resource availability or unavailability and the social groups who have access to them.[6] As such, physical and economic resources define both territories and the grievances created therein. For example, in a tenement house far from public transportation, physical transportation capabilities limit employment opportunities, creating obstacles to opportunity and upward mobility. This chapter focuses on physical territories but as they apply to both physical and nonphysical boundaries and targets. Grievances also derive from physically separated marginalized groups, as reflected in architecture and urban-enclavization or imposed territorialization.[7]

Collective Behavior

The predominant theory on collective behavior comes from Neil J. Smelser's *The Theory of Collective Behavior*, which defines collective behavior as the spontaneous emergence of social groups outside of the norm, but other definitions also focus on collective behavior between both institutional and emergent behaviors.[8] Jack M. Weller and Enrico L. Quarantelli claim collective behavior links to emergent

[5] The International Peace Academy's Program on Economic Agendas in Civil Wars case studies compiled by Ballentine and Nitzschke place both greed and grievance into the category of "incentives for self-enrichment and/or opportunities for insurgent mobilization." Ballentine and Nitzschke, *Beyond Greed and Grievance*, 2.

[6] Edward Aspinall, "The Construction of Grievance: Natural Resources and Identity in a Separatist Conflict," *Journal of Conflict Resolution* 51, no. 6 (December 2007): 950–72.

[7] Mike Davis, *City of Quartz: Excavating the Future in Los Angeles* (New York: Verso, 1990). Davis defines *enclavization* in Los Angles as the separation between economically disparate communities. The Hollywood neighborhoods wall themselves off and hire armed private guards. Short distances away are low-income areas. The author describes how the obsession in Los Angeles with physical security has led to these walled private communities. Enclavization is evident in any modern city and gentrification often emphasizes the separation; southeast Washington, DC, is the perfect example. The neighborhood immediately adjacent to the Marine Barracks at 8th and I Streets and the Navy Yard is upscale, replete with expensive boutiques and bars, but just a few blocks away the community suffers frequent street crime.

[8] Neil J. Smelser, *The Theory of Collective Behavior* (New York: Free Press, 1962).

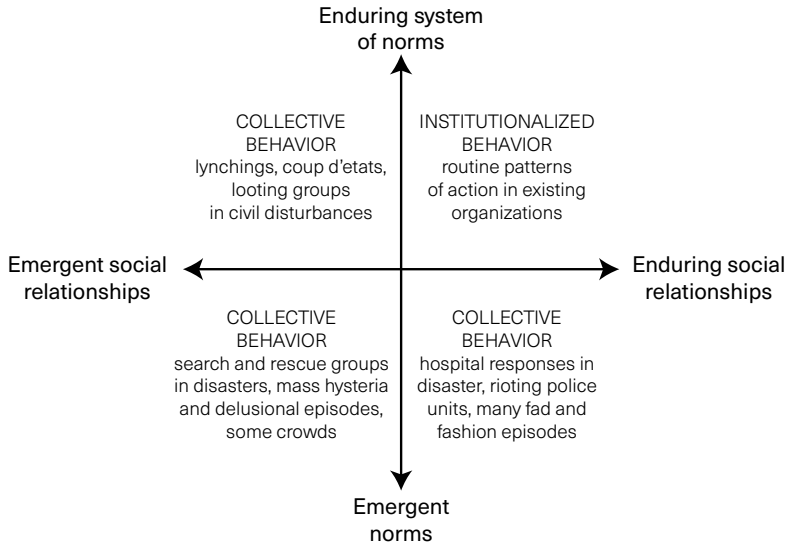

Enduring system of norms
COLLECTIVE BEHAVIOR lynchings, coup d'etats, looting groups in civil disturbances
INSTITUTIONALIZED BEHAVIOR routine patterns of action in existing organizations
Emergent social relationships
Enduring social relationships
COLLECTIVE BEHAVIOR search and rescue groups in disasters, mass hysteria and delusional episodes, some crowds
COLLECTIVE BEHAVIOR hospital responses in disaster, rioting police units, many fad and fashion episodes
Emergent norms

Figure 2.1 Collective behavior.
Illustration by MCUP

and institutional social relationships and norms.[9] As seen in figure 2.1, three out of the four quadrants of collective behavior lead to some level of violent masses.

Richard A. Berk notes evidence of rational decisions in a riotous environment as a manifestation of collective behavior. Berk studied group decision making by considering the underlying causes behind collective violence. He used game theory and an action list to determine acts based on rationality and the personal cost of involvement.[10] Berk's research found that the selection of targets is not a result of mass irrationality but rather the conscious and subconscious thought behind collective violence. Although the target (e.g., vehicle, store window, etc.) may

[9] Jack M. Weller and E. L. Quarantelli, "Neglected Characteristics of Collective Behavior," *American Journal of Sociology* 79, no. 3 (November 1973): 665–85, https://doi.org/10.1086/225589.
[10] Richard A. Berk, "A Gaming Approach to Crowd Behavior," *American Sociological Review* 39, no. 3 (June 1974): 355–73.

actually be the neighborhood itself or the symbols of economic prosperity. His case study looked at an anti-Vietnam protest that took place on the campus of Northwestern University in Chicago. The event incited enough fervor that protestors blocked off major roads as a form of immediate protest.[11] The act took place without a well-defined goal; however, the participants shared a grievance against the Vietnam War, whereby blocking the road served as an immediate announcement to nonparticipants of the grievance. Targets may be tied directly to the grievance or simply an unfortunate target of opportunity.

For the purposes of this discussion, collective social actions form a cohesive group or transient mass. This chapter will demonstrate that spontaneous behaviors define territories when they lead to collective violence. Roberta Senechal de la Roche sees collective violence as a deviation from social control and common norms. These manifestations of collective behavior can happen quickly in the form of transient mass, where the mass may not be violent but will respond similarly to collective behavior with shared information driving its action. Collective violence manifests in the form of violent crowds, riots, lynching, vigilantism, and terrorism.[12] The latter two events tend to be well-organized and longer lasting in duration, although all may be evident in a megacity environment. For the state to best react to these acts of violence, it must define the space around them.

Territories

The *Oxford English Dictionary* defines the term *territories* as an area of knowledge, activity, or experience, or as land with a specified characteristic. Representations of regions or territories are discussed at length in conflict studies. The most prevalent border disputes are interstate, but those same definitions and historical associations of social borders apply to enclaves within a densely populated environment.[13] In the context of this discussion, territory is much more fluid than state

[11] Berk, "A Gaming Approach to Crowd Behavior," 355.
[12] Roberta Senechal de la Roche, "Collective Violence as Social Control," *Sociological Forum* 11, no. 1 (March 1996): 97–128.
[13] Karen A. Rasler and William R. Thompson, "Contested Territory, Strategic Rivalries, and Conflict Escalation," *International Studies Quarterly* 50, no. 1 (March 2006).

borders and reflects social rather than formal lines. The changing role of boundaries at the national and megacity level has been the subject of formal research. Friedrich Kratochwil studied territorial social organizations and their effect on the international system. His research revealed how modern attempts to create functional regimes better managed the conflict resulting from lack of access to resources and political interest.[14] In this instance, the social organization borders were more efficient managing resources and changed the formal definitions of territory to a social focus. Another study on territories looked at social and economic borders in Los Angeles, where luxury lifestyles are physically defended to create a culture of physical security, as previously described in Davis's book *City of Quartz*.[15]

John Gerard Ruggie defines territory in relation to collective behavior as a "spatial extension" and "the social facility of any spatial extension in turn implies some mode of differentiating human collectivities from one another."[16] Many sociology and political science studies on territories relate directly back to group collective behavior. For the sake of this discussion, the term *territories* represents any definable physical area containing multiple possible targets and avenues for maneuver.

State Influence

Our discussion will frequently focus on the goal of state influence. In a densely populated environment, collective behavior often leads to state security losing the ability to influence or minimize the negative impact of a violent situation. The case studies discussed below illustrate two such examples of local legitimate security forces losing control of a situation. Control is not the goal in a densely populated area, as one group may never have complete control. However, influencing the action of collective behavior groups to protect resources and property is the goal of state security influence.

---

[14] Friedrich Kratochwil, "Of Systems, Boundaries, and Territoriality: An Inquiry into the Formation of the State System," *World Politics* 39, no. 1 (October 1986): 27–52.
[15] Davis, *City of Quartz*, 223.
[16] John Gerard Ruggie, "Territoriality and Beyond: Problematizing Modernity in International Relations," *International Organization* 47, no. 1 (Winter 1993): 148.

Megacities operate based on numerous variables regarding transient mass populations and collective behavior. The case studies below operate on a few assumptions. Megacities exist in a state strong enough to support existing political and economic systems in place, and these systems have the capability to respond to grievances and threats to security. In the Los Angeles and Paris riots, the existing security system was the local police force. A megacity's characteristics also include a breadth and depth of character, meaning there will exist, in relatively small spaces, a variety of social and economic classes. Territories already exist within densely populated areas, and they are capable of fostering collective behavior.

Collective behavior and grievances drive the creation of physical territories. The physical attributes of a city can influence collective violence by allowing fluidity of forces or influence around the territories supporting collective behavior/violence. The attributes associated with territorialization from collective behavior empower a military force attempting to minimize the impact of conflict, particularly when these territories have borders and targets that can be exploited by military operations.

Drawing borders around these territories and identifying targets allows for the maneuver of security forces within an area already plagued by collective violence. The 1992 Los Angeles and 2005–6 Paris riots case studies evaluate how collective behavior developed because of existing grievances, territorialization, and transient mass formation after specific events. Our discussion will conclude with an assessment of state security responses and the specific targets of the collective behavior. These cases amplify the patterns of collective behavior based on grievance and translate the grievances into territories. In both cases, the initial security response did little to quell the riots. However, the aftereffects formed the basis for a military concept that will use territorialization to minimize the impact of collective violence and to maximize state security influence.

CASE STUDIES

On 29 April 1992 in Los Angeles, the jury's findings from the Rodney King trial were released. The court had found the four white Los

Angeles Police Department (LAPD) officers not guilty of beating an unarmed black man, Rodney King, the previous March. Bystanders videotaped the entire attack. The court decision met with protests that spread across the city, eventually causing the mayor to request military assistance after five days of riots, looting, and arson.

On 25 October 2005 in Clichy-sous-Bois on the outskirts of Paris, a group of teens on their way home from playing soccer were loitering near their homes and a concerned citizen called the police. As squad cars approached, the youths fled from the officers and three were electrocuted when they hid near a power substation. Zyed Benna and Bouna Traoré both died as a result of their injuries. The public believed their deaths were directly linked to the officers failing to act. The unrest escalated in Clichy-sous-Bois in the form of rioting crowds, which then spread around the country in the following weeks, causing a state emergency. By January 2006, the French government passed legislation addressing the grievances about unemployment for immigrants identified as a critical factor during the riots. French citizens repealed the legislation in April 2006 after massive opposition.[17]

By delving into these two cases, we can correlate empirical observations about each of the events. The existing grievances and territories relate directly to how the events unfolded and what the violence targeted. Building a military concept around this logic illustrates the nature of combat stemming from these types of conflicts in a population-dense environment. The case studies highlight six concepts: collective behavior, existing grievances, existing territories, transient mass generation, security responses, and targets of violence.

Collective Behavior

As discussed above, Smelser breaks down social tenets in detail and describes how collective behavior actions take place in a cluster of time and in specific cultural areas. These collectivities can be broken down into physical and temporal collectives.[18] Groups coalesce through social, cultural, and proximity behaviors, and collective behav-

[17] John P. Murphy, "Protest or Riot?: Interpreting Collective Action in Contemporary France," *Anthropological Quarterly* 84, no. 4 (2011): 977–78.
[18] Smelser, *The Theory of Collective Behavior*, 1–5.

ior stems from some level of communication and interaction. This aspect of his theory aligns with the concept of territorialization of social behaviors, where shared grievances facilitate common understanding among individuals. Territories then form from these numerous grievances and previously existing physical or social commonalities.

The combination of aggrieved and compressed populations in territories leads to collective behavior, but it can manifest into collective violence in the form of riots or civil disturbance with the right window of opportunity for transient mass creation. Both the Los Angeles and Paris events are examples of collective behavior that turned violent. Population-dense environments facilitate collective behavior through territoriality.[19] Collective violence is a form of social control to get a group to mimic each other's behavior. Mobs thus are a manifestation of grievances to vent anger.[20] Mobilizations represent the local social or kinship bonds that have been created. Creation of groups bound by collective behavior according to spatial proximity or grievance identification set the stage for collective violence.

The examples from Los Angeles and France both show existing marginalized populations who attempted to address economic and social marginalization through the political system. Modern megacities are a hybrid of networks that link people with similar interests and backgrounds; in this instance, the populations from Los Angeles and Paris shared grievances. In both cases, the grievances stemmed from systemic economic discrimination against immigrant and minority populations, resulting in physical territorialization. These obvious physical boundaries represent the first step in territorialized collective behavior of similarly aggrieved people in one area.

Existing Grievances

Sociopolitical differences lead to grievances within population-dense environments of vastly different social classes in close proximity, which can exemplify those differences and make grievances more prominent. Grievances develop when a population or territory does

[19] Ruggie, "Territoriality and Beyond," 150.
[20] Senechal de la Roche, "Collective Violence as Social Control," 98.

not have access to basic life necessities or resources. These resources can be as complex as economic opportunities, political influence, and education, or as simple as clean water and sewage systems.

Grievances also are related to structures and existing territories. Common grievances are the glue that forms territories from commonalities between the aggrieved. The immigrant populations in Paris had similar religious views.[21] With continued immigration, both legal and illegal, and a slowing economy, the job market dried up as some areas saw almost 30 percent unemployment.[22] Attempts were made at integration policies to curb Islamic radicalism but instead limited Islamic identity.[23] In March 2004, the Jacques R. Chirac government passed a secularization law banning religious symbols in public primary and secondary schools; for example, Islamic girls could no longer wear traditional headscarves.[24] Despite continued cultural integration of second- and third-generation immigrants, there was a general dissatisfaction with the unfulfilled promise of economic and political integration.[25]

Existing Territories

The creation of territories and identifying borders and targets can be done within social, nonsocial, physical, and economic borders; for example, the space between public transportation stops or a neighborhood and business area that shares a language forms physical borders. States further define territories in megacities through civil planning characteristics: zoning, property taxes, and services provided. Nonsocial territorialization can be seen in public transportation, which is

[21] Jason Burke, "Fires of 'Civil War' Erupt in Paris," *Guardian*, 29 October 2005.
[22] Craig S. Smith, "Immigrant Rioting Flares in Northern France for Ninth Night," *New York Times*, 5 November 2005.
[23] Catherine Wihtol de Wenden, "Urban Riots in France," *SAIS Review of International Affairs* 26, no. 2 (Summer/Fall 2006): 51, https://doi.org/10.1353/sais.2006.0032.
[24] French Law No. 2004-228 from 15 March 2004 applies the principle of the separation of church and state and concerns wearing symbols or garb that show religious affiliation in public primary and secondary schools.
[25] Raphaël Canet et al., "France's Burning Issue: Understanding the Urban Riots of November 2005," in *Crowd Actions in Britain and France from the Middle Ages to the Modern World*, ed. Michael T. Davis (London: Palgrave Macmillan, 2015), https://doi.org/10.1057/9781137316516.

defined as a physical representation of network pathways and avenues of approach. These avenues delineate territories and offer utility for maneuver during a conflict scenario. Space plays a central role in social change and collective action and defines perceptual avenues for action.[26] Social space includes physical resources such as businesses or essential services. Perpetual avenues for action are represented by the major highways defining neighborhoods, causeways, or canals that form physical borders or territories. Territory creation in megacities happens through geographic, ethnic, and economic boundaries and common grievances that all lead to collective behavior. A common grievance might be poor access to employment opportunities due to the lack of public transportation. Unemployed people from one territory use the same limited resources, and frustration with the limited resources leads to collective behavior. Territories are complicated—like the stories of William Shakespeare's *Romeo and Juliet* and Arthur Laurents's *West Side Story*—the populations live with each other but divide socially or politically.[27]

Territorialization began in France in the 1960s with an influx of immigrants from North Africa and the Maghreb regions during reconstruction. These marginalized newcomers lived in large-scale public housing projects and were subjected to the French form of cultural integration.[28] Many of the second- and third-generation immigrants had culturally assimilated but remained on the outskirts of society—physically and figuratively—because of entrenched anti-immigrant xenophobia and economic discrimination. These districts were economically isolated and physically disconnected from public transportation and city centers. In 2005, conflicts constantly erupted between police and Muslim youth. The segregation of neighborhoods

[26] Robert Beauregard, "Time, Action, Space" (masters diss., Graduate School of Architecture, Planning, and Preservation, Columbia University, 2011), 365.
[27] Charles Tilly, *The Politics of Collective Violence* (Cambridge, UK: Cambridge University Press, 2003), 99.
[28] The French integration system in place from the nineteenth to the twentieth century rested on three pillars: school, compulsory military service, and work. For more on the French Republican model, see Yann Algan et al., "Cultural Integration in France," in *Cultural Integration of Immigrants in Europe*, ed. Yann Algan et al. (Oxford: Oxford University Press, 2012), https://doi.org/10.1093/acprof:oso/9780199660094.003.0002.

further compounded the problem by discouraging assimilation with the French population.[29] Failed attempts at engaging political tools left these North African and Arab populations frustrated and intentionally territorialized. In October 2005, French Minister of the Interior Nicolas Sarkozy had begun a new offensive against 25 tough neighborhoods across France.[30]

Just as in Paris, a history of racial and economic segregation was prevalent in Los Angeles. In 1992, the LAPD responsibilities were broken down by regions, bureaus, and divisions.[31] These divisions aligned with the relative economic classification of the neighborhood. Mike Davis discusses the lack of public spaces (e.g., public restrooms kept nonresidents away from certain commercial areas) for all the classes to commune due to a defense of luxury lifestyle and an obsession with physical security.[32] Los Angeles territories further developed along lines of economic distribution. Black gang culture evolved in the 1970s along clear territorial lines. Decades of gang and drug violence had partitioned off the city into small social and economic territories (figure 2.2).[33] As a result, gangs as social groups act as motivation for collective behavior and collective violence. In both Paris and Los Angeles, the violence happened in the vicinity of the belligerents, and the people involved in the crimes did not leave the area. In both cases, the existing territories affected how the crowds reacted and where they operated. Decades of segregation and marginalization festered beneath the surface of a population ripe for action.

Transient Mass Generation

We respect the republic; the republic has to respect us.

~Siako Karne[34]

[29] Wihtol de Wenden, "Urban Riots in France," 47–50.
[30] Burke, "Fires of 'Civil War' Erupt in Paris."
[31] Burt Useem, "The State and Collective Disorders: The Los Angeles Riot/Protest of April, 1992," *Social Forces* 76, no. 2 (December 1997): 362.
[32] Davis, *City of Quartz*, 266.
[33] Davis, *City of Quartz*, 267.
[34] Brother of a teenager whose death sparked the 2005 riots as quoted in Burke, "Fires of 'Civil War' Erupt in Paris."

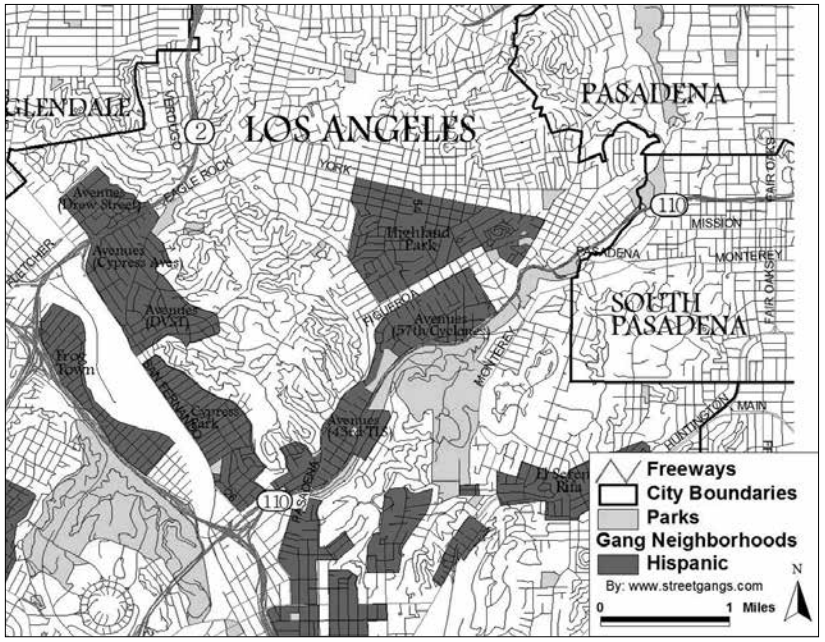


Figure 2.2 1972 Figueroa Street gang map.
Davis, City of Quartz*, 301*

Mobilizing agents exploit critical events and manufacture windows of opportunity. They seek to leverage a shocking event to mobilize other citizens. Smelser describes collective behavior actions as taking place in a cluster of time and in specific cultural areas.[35] Physical territories created by the geographic containment of specific social and immigrant groups in both Los Angeles and across France defined areas ripe for collective behavior. The timing required a specific event, which generated action against the government's security. Opportunities for collective violence originated in Los Angeles with the release of the results of the case against the officers who beat Rodney King, and in Paris with the death of innocent Muslim teens outside of Paris. The collective behavior actions in both cases represent transient mass generation, which evolved into collective violence.

[35] Smelser, *The Theory of Collective Behavior*, 23.

The Los Angeles riots spread because of the immediate news coverage of the action that began at Florence and Normandie avenues in South Central Los Angeles. The city's habit of live broadcasts for unfolding crimes had the unintended effect of serving as a call to action for other rioters. When they arrived on the scene, crowds targeted and drove out the police officers. The actions at that intersection were the flashpoint for the riot, and by early evening on 29 April, the intensity of the protests prevented the LAPD from gaining control.[36]

The Paris riots also spread quickly but were not limited to that city. The North African and Muslim populations had an existing social network, and the fervor spread throughout the social organization of marginalized peoples. News articles kindled years of frustration with a system that focused on socialization and not racism, whereby citizenship provided for integration regardless of ethnicity but did not represent reality.[37] France met Smesler's time and space requirements for the collective behavior from October 2005 to spread throughout the country.

The transient mass generation in both cases had a great deal to do with the population density in small areas with groups sharing a grievance. The shared narratives led to collective action through information sharing. The aggrieved people needed a single event to set off the collective behavior and turn it into civil disobedience. The territorialized grievances separating populations and denying opportunities are the necessary condition; windows of opportunity for civil disturbance are the black swans.[38] However, the government's reaction to the violence can reduce its spread.

Security Responses

Collective violence refers to coordinated destruction in which groups specialize in the deployment of coercive means to "undertake programs of action that cause damage," according the Charles Tilly.[39] Ri-

[36] Useem, "The State and Collective Disorders," 364.
[37] Wihtol de Wenden, "Urban Riots in France," 51; and Murphy, "Protest or Riot?," 981.
[38] Nassim Nicholas Taleb's definition for the term *black swan* refers to an event that comes as a surprise, has a major effect, and is often inappropriately rationalized after the fact with the benefit of hindsight. See Nassim Nicholas Taleb, *The Black Swan: The Impact of the Highly Improbable* (New York: Random House, 2010).
[39] Tilly, *The Politics of Collective Violence*, 26.

ots are a perfect example of social or political grievance manifesting into action. Social violence stems from a continuation of the politics of resistance through other means. The response of governmental security forces is imperative to understanding how territorialized collective behavior can shift.[40]

In 1992, LAPD responded to their first calls about rioters and protesters at 1720 in the evening at Florence and Normandie avenues. It was a primarily residential area with the two cross streets as main thoroughfares through the community. Approximately 100 people had gathered, and the police responded within minutes of the initial call with 20 officers. The officers and their vehicles immediately became the target of physical assaults and projectiles. The officers withdrew to the 77th Street community police station more than a mile away.[41] As the civil disturbance expanded across numerous neighborhoods during several days, LAPD and the mayor asked for help. The National Guard mobilized and Joint Task Force Los Angeles (JTF-LA) formed with active duty military forces from the region. The military forces assigned to the civil disturbance mission conducted mostly point and area security missions.[42]

The immediate response to the uprising in Clichy-sous-Bois merited the action of more than 200 riot police officers who were fighting a street battle. The French police also requested support from the French Army, as they had little training for riots.[43] In Paris and Lyon, France, police banned public gatherings, and the government declared a state of emergency in Paris and 30 other areas. The Paris police brought in 2,000 additional officers to handle the escalating situation.[44] After almost three months of violence, the French govern-

[40] Not all collective violence occurs between citizens and authorities, but for the purposes of this discussion that is the only case that will be addressed.
[41] Useem, "The State and Collective Disorders," 363.
[42] Army doctrine on civil disobedience included a large spectrum of operations to combat possible insurgent operations (e.g., snipers, bombing, and hostage situations). JTF-LA fell outside the anticipated spectrum of the mission. *Operations Other than War*, vol. III, *Civil Disturbance—LA Riots*, Newsletter No. 93-7 (Fort Leavenworth, KS: Center for Army Lessons Learned, U.S. Army Combined Arms Center, 1993); and *Civil Disturbance Operations*, Field Manual 3-19.15 (Washington, DC: Department of the Army, 2005).
[43] Burke, "Fires of 'Civil War' Erupt in Paris."
[44] "Riot Erupts in French City Centre," BBC News, 13 November 2005.

ment responded with legislation addressing economic grievances caused by lack of access to employment opportunities. This law was similar to America's affirmative action and intended to allow the immigrant North African and Arab populations more access to the job market by encouraging employers.

The significant challenge to the security forces in both the Los Angeles and Paris cases was the requirement to respond to multiple areas of disturbance simultaneously, which required significant coordination efforts beyond that of just local law enforcement. Engagement from national security forces is often necessary for collective behavior events that spread beyond one area or city. Regular law enforcement officers are not trained to deal with large violent crowds, and the military had to step in for both situations. Aside from coordination efforts for security missions, the forces must be concerned with targeting the collective violence.

Targets of Violence

Collective violence can have specific targets.[45] Targets in the Los Angeles riots started out as the responding officers and their vehicles. The collective violence spread to looting, assault, robbery, and assault with a deadly weapon. An unfortunate target of opportunity was found in Reginald Denny, a white construction truck driver, who came to a stop at the corner of Florence and Normandie due to the crowd of people blocking the street. Rioters pulled him out of his vehicle and beat him as a news helicopter hovering overhead caught the entire scene on camera for a live broadcast.[46] The mob mentality exacted revenge for the beating of Rodney King by conducting the same kind of attack. The Paris riots also saw more than 10,000 cars burned and 200 public buildings damaged.[47] In this case, the destruction of public buildings was a representation of grievances with the government system that marginalized these communities. The Paris riots also re-

[45] Andrew W. Martin et al., "Why Targets Matter: Toward a More Inclusive Model of Collective Violence," *American Sociological Review* 74, no. 5 (2009): 821–41, https://doi.org/10.1177/000312240907400507.
[46] Useem, "The State and Collective Disorders," 363.
[47] Murphy, "Protest or Riot?," 978.

sulted in makeshift barricades canalizing any security response and accentuating existing territories.[48] The initial targets—police and their vehicles—were clearly symbols of LAPD, whose actions were the cause of social distress.

Grievance symbols offer an easy target. The Occupy Wall Street movement was a transient mass targeted against wealth distribution in America. They targeted and physically occupied a park near the symbol of American wealth: the New York Stock Exchange.[49] Sharing information on how the target applied to the grievance is important to targeting collective behavior. In Los Angeles, privately owned vehicles and storefronts were symbols of the economic prosperity not enjoyed by the marginalized populations in the area. It is easy for transient mass to exploit targets out in the open. Self-enrichment, looting, or greed may also encourage targeting. A collective behavior event exacerbates looting because the perceived cost of self-enrichment is low. The news helicopters showed numerous incidents of theft and burglary without repercussions from law enforcement, so other individuals made the conscious decision to conduct similar behavior.

MILITARY APPLICATION

If social violence is a continuation of resistance to policy though other means, there is basis for action—grievance and transient mass—which drives the creation of conflict territories. Understanding the social environment and grievances in a population-dense environment will make the conflict easier to fight, though megacity conflicts stemming from collective behavior are hard to predict, limit, and fight. Military units operating in dense environments can identify targets of collective violence and conflict territories as key terrain. Understanding these features of the battlefield allow for maneuver, while knowing the key terrain allows the security force to take advantage of resources. Fighting in megacities requires an understanding of social grievances, overlaid with the physical terrain that people inhabit, to

[48] Burke, "Fires of 'Civil War' Erupt in Paris."

[49] Todd Gitlin, "Occupy's Predicament: The Moment and the Prospects for the Movement," *British Journal for Sociology* 64, no. 1 (March 2013): 3–25, https://doi.org/10.1111/1468-4446.12001.

see territories. Common targets, windows of opportunity, and existing grievances further define these territories.

Grievances against the government then manifest as threats to government buildings or infrastructure. Territories defined by grievances can be as simple as one side of the train tracks with all the industry and no commercial venues or as complicated as small neighborhoods of a few square blocks that share a language. Military operations must exploit the characteristics of these territories by understanding how to move around them or through them and to use the resources found there. This operational concept establishes principles for combat in population-dense environments during conflicts of collective violence to minimize damage and quickly regain state influence. Effectively operating a military force in a megacity requires an understanding of social territories to use available resources and to minimize conflict.

A megacity houses vast swaths of social identities with disproportionate resource distribution. Sociopolitical differences can lead to grievance, especially between the haves and the have-nots.[50] Many of these groups in close proximity share grievances, which develop when a population or territory does not have access to physical, political, or economic resources.[51] Urban areas support territories of different social classes in close proximity, which amplifies the experience of difference. Social identity theory states that individuals will categorize themselves within a specific group or groups as part of their social identity, and they will act on behalf of that group's interests.[52] Territories of social difference define urban terrain, and within these

[50] Ballentine and Nitzschke, *Beyond Greed and Grievance*; and Davis, *City of Quartz.*

[51] Ballentine and Nitzschke, *Beyond Greed and Grievance*, discusses the concepts of justice-seeking grievance versus loot-seeking greed.

[52] Jan E. Stets and Peter J. Burke, "Identity Theory and Social Identity Theory," *Social Psychology Quarterly* 63, no. 3 (September 2000): 225, https://doi.org/10.2307/2695870. Through the process of self-categorization or identification, an identity is formed. Social categories in which individuals place themselves are part of a structured society and exist only in relation to other contrasting categories (e.g., black versus white); each has more or less power, prestige, status, and so on. Further, these authors point out that the social categories precede individuals; individuals are born into a prestructured society. Once in society, people derive their identity or sense of self largely from the social categories to which they already belong.

territories exists the possibility of collective action. As such, collective behavior territories evolve from common grievances and existing social boundaries. Understanding key terrain allows militaries to narrow operations in a megacity conflict. Physical territories created by the geographic containment of specific groups defined by grievance are ripe for collective behavior or the spontaneous emergence of social groups outside the norm.[53] These groups can evolve into collective violence in the form of violent crowds, riots, and terrorism.[54]

The Marine Corps' concept publication *Expeditionary Force 21* embraces fighting in small units in a distributed fashion.[55] Fighting in a megacity against collective violence requires fighting in a dispersed manner. Security operations during a conflict in a population-dense environment would mimic local policing in many ways. Local law enforcement has the advantage of understanding the local areas, grievances, and existing territories. Community-based policing focuses on understanding the low-level local dynamics of a neighborhood. Crime prevention and quality of life improvement are the focus of community-oriented policing.[56] However, information gained from close involvement with a community would be invaluable to determining territorial borders, grievance targets, and resources available during a collective violence event. Coordination with local law enforcement or community organizers is imperative to any security action taken in a megacity.

WARFIGHTING FUNCTIONS

Meeting the demands of combat in a population-dense environment requires in-depth understanding of the social terrain and locally available resources. The following principles tailor warfighting functions to operating in a population-dense environment by taking advantage of collective behavior territories:

[53] Smelser, *The Theory of Collective Behavior*.
[54] Senechal de la Roche, "Collective Violence as Social Control."
[55] *Expeditionary Force 21: Forward and Ready—Now and in the Future* (Washington, DC: Marine Corps Combat Development Command, 2014).
[56] Allison Taylor Chappell, "Learning in Action: Training the Community Policing Officer" (PhD diss., University of Florida, 2005).

- Command and Control: megacity conflict environments require distributed operations and effective communication.
  - ¤ Mission orders with clear constraints enable small units to operate independently.
  - ¤ All elements must remain connected with local law enforcement and joint forces to coordinate efforts at all levels.
  - ¤ Take advantage of existing law enforcement relationships and command and control assets.
  - ¤ Coordinate with community-oriented police officers, and use existing police facilities where possible.
- Force Protection: fight in small units.
  - ¤ Understanding the culture and the specific identifying symbols of social groups will help the force identify individuals as part of the conflict.[57] Additional cultural understanding symbols prevent a force from offending the local population or preventing positive influence.
- Intelligence: maximize human terrain mapping.
  - ¤ Identification of grievances, collective violence targets, and existing physical boundaries (e.g., a bad neighborhood) creates territories within a megacity.
  - ¤ Any intelligence preparation of the battlefield must include social groups, income levels, age of neighborhoods, and assessments of horizontal inequality (e.g., existing gang territories).
  - ¤ Investigate local grievances or historical protests to better identify possible targets (e.g., local government buildings, schools, or police stations) if there is a grievance with government representation.
- Fires: use precision and small caliber fires.
  - ¤ The goal is to minimize impact to a densely populated area.
  - ¤ Ensure targeting does not amplify the initial grievance

[57] Stets and Burke, "Identity Theory and Social Identity Theory," 226.

(e.g., destroying the only water-purification plant in a desert is counterproductive).
    - ¤ Use smaller caliber weapons will reduce ordnance approval requirements.
- Logistics: use lines of communication that flow between territories and take advantage of existing resources or create your own.
    - ¤ Take the road that runs between two rival factions. Lack of coordination between groups works in favor of military forces.
    - ¤ Use all the dimensions of an urban environment for resupply. Small, unmanned aerial delivery systems (e.g., KMAX or CRUAS) provide fast resupply without long supply lines.[58]
    - ¤ Use three-dimensional printing or existing resources (e.g., water sources that can be purified or local food) to further minimize resupply requirements and improve maintenance and repair part requirements.
- Maneuver: move in small units from different assembly areas and simultaneously converge on one objective.
    - ¤ Territory borders form from social, nonsocial, physical, and economic borders, including racially or economically exclusive neighborhoods, areas physically confined by infrastructure, or neighborhoods with shared traits for marginalization.
    - ¤ Establish maneuver corridors between neighborhoods and factions.

These principles for combat in megacities are attainable with minimal adjustments to existing acquisition plans. The Department of Defense has already invested in developing the technology needed

[58] Richard Scott, "Unmanned K-MAX Wins Praise for Afghanistan Cargo Resupply Operations," *Jane's Navy International*, 25 July 2012.

for improved logistics.[59] A number of strategic and operational implications are associated with operating under this concept. Doctrine, organization, training, materiel, leadership, education, personnel, and facilities changes are minimal with this operating concept.

CONCLUSIONS

Concepts from *Expeditionary Force 21* and the new *U.S. Army Operating Concept* note the character of conflict in dense urban environments, but it will take more than simple tactics to win in a population-dense environment.[60] Knowing the ground and the social possibilities helps inform the warfighter of possible targets, available resources, and maneuverability corridors. An emphasis on understanding the social terrain of the urban battlefield is imperative to minimizing the long-term impact of conflict. If social violence is a continuation of resistance to policy through other means, then the military must understand the cause of resistance to combat the violence. Fighting in a megacity requires an understanding of the social environment and how existing grievances and boundaries form territories. Knowing what the territories hold allows effective maneuver on the battlefield by a security force, thus minimizing the impact of a conflict formed by collective violence.

[59] Nick Brown et al., "Make and Mend: The Revolutionary Promise of 3-D Printing," *International Defence Review*, 16 September 2014.
[60] *The U.S. Army Operating Concept: Win in a Complex World, 2020–2040*, TRADOC Pamphlet 525-3-1 (Washington, DC: Department of the Army, 2014).

CHAPTER THREE

The 2008 Battle of Sadr City

Implications for Future Urban Combat

David E. Johnson and M. Wade Markel

U.S. and Iraqi troops clashed in Sadr City, where many of the Shiite militants are loyal to cleric Muqtada al-Sadr and his Mahdi Army (Jaysh al-Mahdi). The fighting intensified on 25 March, when the Iraqi government announced a crackdown on criminal elements in al-Basrah, a Shiite stronghold in southern Iraq. The violence soon spread through southern Iraq's Shiite heartland and into Shiite neighborhoods in the capital. The number of Iraqi civilians killed and wounded nationwide continued to increase—February saw 633 deaths and 701 wounded; March saw 923 deaths and 1,358 wounded; and April saw 969 deaths and 1,750 wounded.

The U.S. military, particularly the Army, devotes considerable effort to the difficult challenges of combat in urban areas, particularly in megacities.[1] The strategic importance of cities is timeless. From Troy to Baghdad, their significance remains consistent because, as Carl von Clausewitz wrote in *Principles of War*: "In order to seize the enemy's

[1] The chief of staff of the Army Strategic Studies Group and the U.S. Army Training and Doctrine Command (TRADOC) have both made megacities an area of inquiry. See Michael Bailey et al., "A Proposed Framework for Appreciating Megacities: A US Army Perspective," *Small Wars Journal* 10, no. 4 (2014): and Kevin M. Felix and Frederick D. Wong, "The Case for Megacities," *Parameters* 45, no. 1 (Spring 2015).

material forces we should direct our operations against the places where most of these resources are concentrated: principal cities, storehouses, and large fortresses. On the way to these objectives we shall encounter the enemy's main force or at least a considerable part of it."[2] Capital cities were of particular importance to Clausewitz: "Public opinion is won through great victories and the occupation of the enemy's capital."[3]

Russia's experiences in Grozny, Chechnya (1999–2000), and the U.S. fight in Fallujah, Iraq (2004), are two recent examples of modern urban combat operations that accomplished their objectives. In both of these cases, the objective was to destroy enemy forces that had made the city their base of operations. The battles of Grozny and Fallujah were remarkably similar: the city was surrounded, noncombatants urged to flee, and combined arms forces went block-by-block killing or capturing their adversaries until the city was cleared. Unsurprisingly, the levels of destruction and friendly casualties were both high in Grozny and Fallujah.[4]

In 2008, Sadr City, Iraq, presented a different problem than either Grozny or Fallujah. Built in 1959 to address a severe housing shortage in Baghdad, the suburb was originally named al-Thawra or Saddam City. It would later be renamed in honor of Ayatollah Mohammad Sadec al-Sadr. Sadr City was part of the larger Coalition effort to bring stability to greater Baghdad. The ability to shrink the problem by evacuating noncombatants was not an option, as there was nowhere in Baghdad for more than 2 million noncombatants to go. U.S. forces could face similar issues in large urban areas in the future.

---

[2] Carl von Clausewitz, *Principles of War*, trans. and ed. Hans W. Gatzke (Harrisburg, PA: Military Service Publishing Company, 1942); reprint (Mineola, NY: Dover Publications, 2003), 45–46.

[3] Clausewitz, *Principles of War*, 46.

[4] On Grozny, see David E. Johnson et al., *In the Middle of the Fight: An Assessment of Medium-Armored Forces in Past Military Operations* (Santa Monica, CA: Rand, 2008), 114–22. On Fallujah, see Matt M. Matthews, *Operation Al Fajr: A Study in Army and Marine Corps Joint Operations* (Fort Leavenworth, KS: Combat Studies Institute Press, 2006). The Russians were much less discriminate in their use of fires in Grozny than Coalition forces in Fallujah. See Timothy L. Thomas, "Grozny 2000: Urban Combat Lessons Learned," *Military Review* (July–August 2000). Thomas notes that Grozny was essentially a free-fire zone and that the Russians led with massive fires and followed up with maneuver.

A new approach to urban combat grew out of the challenges the U.S. brigade commander faced in the 2008 Battle of Sadr City. The defeat of the relatively small number of Jaysh al-Mahdi (JAM) militia was the objective in Sadr City, just as it had been with the Chechen militia in Grozny and the al-Qaeda terrorists in Fallujah. What evolved from it, however, parallels Julian S. Corbett's classic treatise *Some Principles of Maritime Strategy* more so than lessons from Grozny or Fallujah, much less Stalingrad or Berlin: "That seeing that the defensive is a stronger form of war than the offensive, it is prima facie better strategy to make the enemy come to you than to go to him and seek a decision on his own ground."[5]

BACKGROUND AND METHODOLOGY

In late March 2008, a key battle took place in Sadr City, a Shia area of Baghdad with an estimated 2.4 million residents. This battle solidified the authority of Iraqi prime minister Nouri al-Maliki and enabled him to extend government control to the whole of Baghdad. Thus, the battle created some of the conditions that eventually allowed the United States to realize its objectives in Iraq.[6]

The authors used after action reports, briefings, and other primary and secondary sources to support their research. The most valuable sources, however, came from interviews conducted between August 2009 and April 2011 with a broad range of military participants from the units involved in the following phases: the prebattle surge in the vicinity of Sadr City, the Battle of Sadr City, and the post-battle stabilization and reconstruction efforts. These participants ranged from lieutenants to the commanding general of the U.S. Army's 4th Infantry Division. Interviews were conducted primarily with Army officers but also included a U.S. Air Force offi-

[5] Julian S. Corbett, *Some Principles of Maritime Strategy* (London: Longmans, Green, 1918); reprint, with introduction and notes by Eric J. Grove (Annapolis, MD: Naval Institute Press, 1988), 324–25.

[6] This chapter summarizes the analysis from David E. Johnson et al., *The 2008 Battle of Sadr City: Reimagining Urban Combat* (Santa Monica, CA: Rand, 2013). The monograph provided an operational analysis of the battle, explained how the tactics developed and employed contributed to the outcome, and derived implications for the future conduct of military operations. To that point, little had been written about the battle.

cer, a former Iraqi intelligence official, and U.S. government officials. These interviews provided critical information about not only what happened but also why it happened.

SETTING CONDITIONS

The 2008 Battle of Sadr City took place nearly 15 months after the beginning of the U.S. surge in Iraq. When President George W. Bush announced the surge in a 10 January 2007 speech, he stated the mission of U.S. forces was "to help Iraqis clear and secure neighborhoods, to help them protect the local population, and to help ensure that the Iraqi forces left behind are capable of providing the security that Baghdad needs."[7] The Operation Enforcing the Law, or Baghdad Security Plan, was a key element of the surge.[8] Its purpose was announced by Major General Joseph F. Fil Jr., commander of the Multinational Division–Baghdad (MND-B), on 16 February 2007:

> This new plan involves three basic parts: clear, control and retain. The first objective within each of the security districts in the Iraqi capital is to clear out extremist elements neighborhood by neighborhood in an effort to protect the population. And after an area is cleared, we're moving to what we call the control operation. Together with our Iraqi counterparts, we'll maintain a full-time presence on the streets, and we'll do this by building and maintaining joint security stations throughout the city. This effort to reestablish the joint security stations is well under way. The number of stations in each district will be determined by the commanders on the ground who control that area. An area moves into the retain phase when the Iraqi security forces are fully responsible for the day-to-day security mission. At this point, Coalition Forces begin to move out of the neighborhood and into locations where they can respond to requests for assistance as needed. During these three phases, efforts will be ongoing to stimulate local economies by creating

[7] President George W. Bush, as quoted in Kimberly Kagan, *Enforcing the Law: The Baghdad Security Plan Begins* (Washington, DC: Institute for the Study of War, 2007), 2.
[8] Kagan, *Enforcing the Law*.

> employment opportunities, initiating reconstruction projects and improving the infrastructure. These efforts will be spearheaded by neighborhood advisory councils, district advisory councils and the government of Iraq.[9]

By March 2008, implementation of the Baghdad Security Plan had achieved several results that set conditions for a battle in Sadr City. First, al-Qaeda in Iraq had been badly hurt, and its ability to create mass-casualty events was significantly reduced. This allowed Coalition forces to turn their attention to other destabilizing elements, such as the movement led by and identified with Moqtada al-Sadr.[10] Second, the plan had strengthened the position of the government led by Prime Minister al-Maliki, enabling it to survive a rupture with the Sadrist Movement.[11] Indeed, al-Maliki was moving to confront the Sadrist militias in al-Basrah, and preparations were well under way by March 2008. Third, Coalition forces had largely contained JAM, the Sadrists' armed militia, to Sadr City, a circumstance that would severely constrain JAM's capabilities in the coming battle.

Moving U.S. troops from their forward operating bases into smaller outposts throughout Baghdad was fundamental to the execution of the Baghdad Security Plan. Key components of the unfolding operations included:

- Directly confront insurgent elements in Baghdad, thereby leading to better local security, cooperation, and human intelligence.
- Use concrete barriers and checkpoints to:
  - Limit the ability of insurgents to create mass-casualty events with improvised explosive devices (IEDs), particularly large, vehicle-borne IEDs.

[9] Kagan, *Enforcing the Law*, 3.

[10] MajGen Jeffery W. Hammond, USA, interview with David E. Johnson and M. Wade Markel, Fort McPherson, GA, 25 February 2010.

[11] In 2003, al-Sadr headed a Shiite political movement known as the Sadrist Movement that attracted millions of Shiite followers from across Iraq, though primarily the youth, poor, and downtrodden, to whom he offered social, educational, and health services. Al-Sadr also maintained tight security over the areas he controlled and established a court system based on Sharia (Islamic law).

    - ¤ Disrupt the enemy's ability to move freely and resupply its forces.
- Integrate special operations forces (SOF), conventional forces, and all means of intelligence to locate and kill or capture insurgent leaders.
- Improve the capability and capacity of Iraqi security forces, including the Iraqi Army and police.[12]

One notable exception remained, however, to the trend of decreasing levels of violence in Baghdad: Sadr City. The U.S. Army's 4th Infantry Division, which by then was serving as MND-B and commanded by Major General Jeffery W. Hammond, had isolated Sadr City to some degree. Within Sadr City's boundaries, however, the militantly anti-American JAM firmly controlled the population. Although SOF and conventional force raids against JAM leadership had resulted in the capture, death, or flight out of Iraq of much of its senior leadership, the raids also caused significant tension between the government of Iraq and JAM. Most notably, U.S. activity in Sadr City had largely ceased by October 2007 in the aftermath of an air strike that killed a number of Iraqi civilians.[13] Prime Minister al-Maliki declared Sadr City off-limits to U.S. ground operations. JAM's firm control of the population already had severely limited U.S. awareness of what was going on inside Sadr City. Following the repercussions of the October 2007 incident, U.S. forces remained largely blind when it came to the JAM stronghold.[14]

It seems likely that al-Maliki's government offensive against militias in al-Basrah, especially JAM, precipitated JAM's own offensive in Baghdad. The al-Maliki government had been making obvious preparations for the al-Basrah offensive since January 2008. Few U.S.

[12] BGen Billy Don Farris II, USA, interview with David E. Johnson, M. Wade Markel, and Brian Shannon, Pentagon, 18 March 2010; and Billy Don Farris II, "Warfighter Observations during the Surge: 2nd Brigade Combat Team, 82nd Airborne Division, 'Task Force Falcon'," briefing, 2008.

[13] Steven R. Hurst, "US: Raid of Baghdad's Sadr City Kills 49," *Washington Post*, 21 October 2007.

[14] Col John H. Hort, USA, interview with David E. Johnson and M. Wade Markel, Carlisle Barracks, PA, 5 November 2010.

officers seemed convinced that Prime Minister al-Maliki was serious about the attack, much less that it would begin as soon as 25 March.[15] JAM apparently believed that attacks in the capital would force the government to return its focus and forces to Baghdad, thus discrediting the al-Maliki government. Besides the apparent logic of the situation, militia members told Washington Post reporters at the time that this was in fact their objective.[16]

On 23 March 2008, a barrage of rockets fired from Sadr City hit targets in Baghdad, including the International Zone (a.k.a. the Green Zone), which houses Iraqi government offices and foreign embassies. The 23 March rocket fire appears to have been JAM's initial response to the movement of Iraqi forces into al-Basrah. Between 23 and 25 March, JAM overran Iraqi checkpoints in and around Sadr City. Other checkpoints were simply occupied by JAM fighters in collusion with their nominal adversaries in the Iraqi police.[17]

The scale of JAM's Sadr City offensive emerged slowly. JAM had fired rockets before. Indeed, it had launched several just a few days earlier on 21–22 March, according to a company commander in the Army's 1st Squadron, 2d Stryker Cavalry Regiment. Taking checkpoints and intimidating government forces was something JAM forces did more or less continuously during this period. The magnitude of the March offensive became apparent after several days.[18]

---

[15] Michael R. Gordon and Gen Bernard E. Trainor describe how U.S. officials viewed Prime Minister Maliki's focus on al-Basrah as a diversion from higher priority efforts against al-Qaeda remnants in Nineveh Province, northern Iraq, and their skepticism of Iraqi preparations for the battle. See Michael R. Gordon and Bernard E. Trainor, *The Endgame: The Inside Story of the Struggle for Iraq, from George W. Bush to Barack Obama* (New York: Pantheon Books, 2012), 464–83. For more contemporary accounts of Iraqi preparations, see "Iraq's Basra Police Chief Says Plan Drawn Up to Eliminate Militias," British Broadcasting Service, 15 March 2008; and Kim Sengupta, "The Final Battle for Basra Is Near, Says Iraqi General," *Independent,* 20 March 2008.

[16] Sudarsan Raghavan, "19 Tense Hours in Sadr City Alongside the Mahdi Army; After Calm Year, Fighting Engulfs Shiite Enclave," *Washington Post*, 29 March 2008, A1.

[17] LtCol Michael Pemrick, USA, interview with M. Wade Markel, Fort Belvoir, VA, 26 February 2010; Maj Brian North, USA, interview with M. Wade Markel and Brian Shannon, Fort Carson, CO, 12 January 2010; LtCol Christopher J. Keller, USA, interview with M. Wade Markel, Arlington, VA, 4 August 2010; and LtCol Robert S. Ballagh, USA, interview with M. Wade Markel, Pentagon, 8 February 2011.

[18] Maj Jason Northrop, USA, interview with David E. Johnson and M. Wade Markel, Arlington, VA, 16 March 2011.

By 25 March, however, a major battle was clearly underway. That day, the government of Iraq launched its offensive in al-Basrah. Al-Sadr therefore publicly ended a self-imposed cease-fire that had been in place since August 2007, and JAM forces throughout Baghdad attacked Coalition and government targets with rocket and mortar fire. By the day's end, JAM had overrun about one-half of the Iraqi security force's checkpoints in and around Sadr City. It also stepped up rocket and mortar attacks against the International Zone. In response, Prime Minister al-Maliki directed Coalition forces to stop the rocket attacks and defeat the criminal militias in Sadr City. The Battle of Sadr City was on.

THE AREA OF OPERATIONS

The battle centered on the Baghdad district of Thawra, which contains the neighborhoods of Sadr City, Ishbiliyah, and Habbibiyah (figure 3.1). Sadr City's area spans approximately 35 square kilometers, roughly half the size of the island of Manhattan at 59 square kilometers. At the time of the battle, Sadr City had, by U.S. military estimates, approximately 2.4 million residents. From the Ishbiliyah and Habbibiyah neighborhoods below Route Gold (al-Quds Street), JAM forces were firing 107mm rockets and mortars into the International Zone.[19] The Ishbiliyah neighborhood also contained the Jamiliyah Market, Baghdad's largest market east of the Tigris River. Protection money from merchants in this market supplied JAM with much of its resources. Coalition forces also had to combat and contain the Sadrist uprising in the adjacent areas east and north of Sadr City.[20]

The International Zone sat at the maximum range of the 107mm rockets and mortars that JAM was firing from its positions below Route Gold. Taking these firing points and pushing JAM above Route Gold

[19] Throughout the text, we refer to the same terrain feature, al-Quds Street, by its Iraqi name and the name it took on U.S. graphic control measures as Route Gold.

[20] Hort interview; Farris interview; Hammond interview; Graham interview; Maj Bryan R. Gibby, USA, telephone interview with M. Wade Markel, 27 January 2010; and LtCol Barry F. Graham, USA, interview with M. Wade Markel, Pentagon, 19 January 2010.

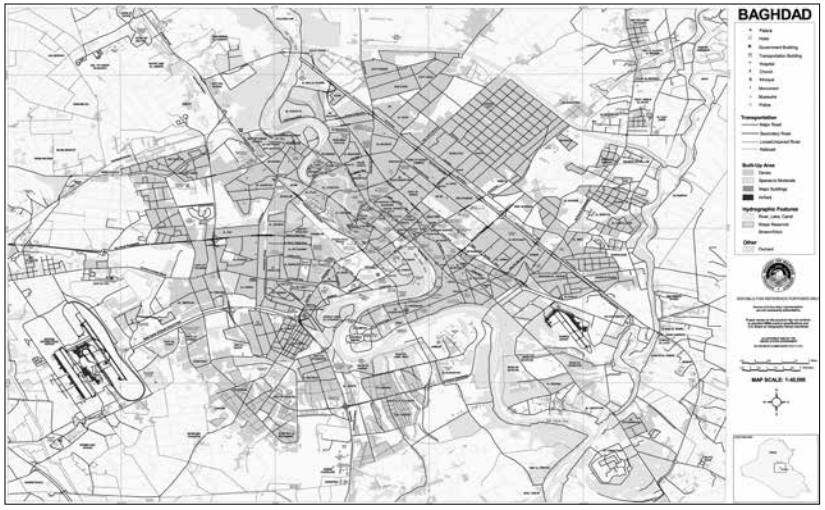


Figure 3.1 The Baghdad International Zone and Sadr City.
National Geospatial Intelligence Agency

would therefore significantly limit JAM's ability to conduct effective indirect fire attacks against the International Zone.[21]

MISSION: STOP THE ROCKETS AND DEFEAT CRIMINAL MILITIAS IN SADR CITY

As noted earlier, on 25 March, Prime Minister al-Maliki directed the Iraqi Army and Coalition forces to stop the rocket attacks and defeat the criminal militias in Sadr City. The task fell to Army Colonel John H. Hort, commander of the 3d Brigade Combat Team, 4th Infantry Division, within whose area of operations Sadr City fell.

General Hammond focused on going after JAM leaders and keeping a lid on the rest of Baghdad. Within Sadr City, operations unfolded in four phases as MND-B responded to developments. During the first phase, U.S. forces seized control of rocket points of origin

[21] Hammond interview; Hort interview; and Maj William Downing, USA, interview with M. Wade Markel and Brian Shannon, Fort Carson, CO, 12 January 2010.

south of Route Gold while Iraqi forces attempted to secure the Ishbiliyah and Habbibiyah neighborhoods. During the second phase, when it became clear that maneuver forces alone could not control JAM's infiltration without a barrier, U.S. forces isolated Ishbiliyah and Habbibiyah from the rest of Sadr City by building a wall 12 feet tall along Route Gold. JAM more or less exhausted itself contesting the wall's construction. During these first two phases, 3d Brigade Combat Team, 4th Infantry Division, and MND-B employed aerial intelligence, surveillance, and reconnaissance (ISR) and strike assets to neutralize JAM's remaining rocket capability. In the third phase, MND-B exploited the success of its security operations by orchestrating an intensive reconstruction effort. In the fourth and final phase, Iraqi security forces, hardened by their earlier fight, occupied the remainder of Sadr City.

The Ground Fight in Sadr City: Armor Matters

The fight in Sadr City involved two phases: Operation Striker Denial (26 March–14 April) and Operation Gold Wall (15 April–15 May). In the first phase, 1st Squadron, 2d Stryker Cavalry Regiment, attacked and seized JAM rocket-firing positions in Ishbiliyah and Habbibiyah, while Task Force, 1st Combined Arms Battalion, 68th Armored Regiment, quelled the Sadrist uprising in areas west and north of Sadr City proper.[22]

When Operation Striker Denial began, U.S. forces immediately encountered JAM forces in prepared positions who were ready and willing to fight. According to U.S. commanders, however, these JAM forces did not fight particularly well.[23] Nevertheless, resistance proved tougher than expected. Within a week, 1st Squadron, 2d

[22] Hammond interview; Hort interview; and Col James E. Rainey, USA, interview with M. Wade Markel and Brian Shannon, Fort Carson, CO, 11 January 2010.

[23] U.S. soldiers to whom we spoke were more or less in complete agreement on this subject, particularly those operating at the tactical level. Col Michael F. Pappal, USA, commanding the task force in 2008, fought in Sadr City in 2004 as major in the 1st Cavalry Division; he felt that the enemy's proficiency had declined significantly since then. Col Pappal, telephone interview with David E. Johnson, M. Wade Markel, and Brian Shannon, 2 July 2010; SgtMaj Steven Lewis, USA, telephone interview with M. Wade Markel, 28 July 2010; Capt Kyle Morse, USA, telephone interview with M. Wade Markel, 6 July 2010; and Northrop interview.

Stryker Cavalry Regiment, lost six of its Stryker vehicles to IEDs and rocket-propelled grenades (RPGs). Colonel Hort decided to reinforce the fight with armor (M1 Abrams tanks and M2 Bradley fighting vehicles) and General Hammond surged five additional companies to 3d Brigade Combat Team, 4th Infantry Division.[24] Armor proved important in the fight, providing firepower and an ability to withstand hits from IEDs and RPGs. Iraqi security forces joined the fight on 5 April, and by 6 April, had fought their way to positions near Route Gold. In that fight, conducted more or less independently from U.S. forces, the Iraqi security forces held their positions against incessant JAM attacks, gaining confidence that proved critical in subsequent phases of the battle.

Unfortunately, occupying key terrain below Route Gold did not confer control of those areas to U.S. and Iraqi forces. Unimpeded movement north of Route Gold allowed JAM to assemble and attack U.S. and Iraqi forces at will. The warren of alleyways and small buildings provided routes for JAM fighters to infiltrate the area below Route Gold. Thus, to hold what they had taken, U.S. and Iraqi forces had to deny JAM the ability to attack south of Route Gold. Access to the area below Route Gold was vital to JAM, so it represented key terrain for Colonel Hort. Operation Gold Wall, the effort to construct a barrier along the length of Route Gold, was intended to deny JAM the ability to operate in the Jamiliyah Market area.[25]

During the 30 days of Operation Gold Wall, Colonel Hort's soldiers emplaced approximately 3,000 12-foot-tall and 5-foot-wide reinforced concrete T-wall sections to create a 4.6-kilometer barrier. JAM fought hard to prevent the establishment of the wall. According to Colonel Hort, the wall in effect "became a magnet for every bad guy in Sadr City." As JAM fighters attacked to stop completion of the wall, the surrounding area became a killing ground. JAM had few good options.

[24] Hammond interview; Hort interview; Lewis interview; Morse interview; and Northrop interview.

[25] It was never clear with whom the idea to isolate the area of operations using T-walls along Route Gold originated. Most of those interviewed credited either Col Hort or Col Farris. Hort credits Farris with the idea, as does Col Daniel R. Barnett, the commander of 1st Squadron, 2d Cavalry Regiment, during the battle.

A completed wall would curtail JAM's access to the population and the market. JAM leaders depended on that access.[26]

Operations Striker Denial and Gold Wall were tough fights, involving three U.S. battalions and Iraqi security forces in continuous operations for six weeks. During this period, Abrams tanks and Bradley fighting vehicles were heavily engaged, firing 818 120mm tank rounds and 12,091 25mm rounds against JAM fighters and to detonate IEDs. Additionally, U.S. forces had to constantly adapt to JAM tactics; for example, JAM snipers used .50-caliber sniper rifles to attempt to knock out the crane that lifted the T-wall sections into place. U.S. forces responded by employing organic U.S. Army and SOF snipers in a countersniper campaign.[27] As the battle wore on, JAM fighters showed up in ever-decreasing numbers as U.S. and Iraqi forces steadily wore them down. The efforts of other U.S. government agencies and SOF complemented the conventional fight to hunt and keep the pressure on JAM leaders in Sadr City. Ultimately, six U.S. soldiers died in these operations, while JAM lost an estimated 700 fighters, and much of its leadership fled for Iran or Syria.[28] On 11 May 2008, al-Sadr asked for another cease-fire.[29]

The Counter-Rocket Fight

As ground maneuver elements fought to isolate Sadr City with the Gold Route wall, Colonel Hort and General Hammond worked to end JAM's indirect-fire attacks on the International Zone. By this point in Operation Iraqi Freedom, Multinational Corps–Iraq (MNC-I) and

[26] Hort interview; Gibby interview; and Col John P. DiGiambattista, interview with M. Wade Markel and Brian Shannon, Fort Carson, CO, 12 January 2010.
[27] Hort interview.
[28] The official estimate from the interviews was 700. According to the British medical journal *The Lancet*, municipal officials in Baghdad estimate that the fighting killed 925 people and wounded 2,605; however, this estimate does not distinguish combatants from noncombatants. See Paul Webster, "Reconstruction Efforts in Iraq Failing Health Care," *Lancet* 373, no. 9664 (2009): 617–20, https://doi.org/10.1016/S0140-6736(09)60382-2. For the exfiltration of JAM's leadership to Iran, we relied on Maj Bryan Gibby, email to M. Wade Markel, "Further Inquiries," 14 January 2011.
[29] Michael Gordon, "In Spite of Truce, War of Attrition over Wall Persists in Sadr City," *New York Times*, 15 May 2008, A6.

MND-B were employing a broad range of U.S. ISR and strike assets in Baghdad.

Colonel Hort had resources directly allocated to him that were unprecedented for a brigade commander, including two U.S. Air Force General Atomics MQ-1 Predator unmanned aircraft systems (UASs) armed with AGM-114 Hellfire missiles, two U.S. Army AAI Corporation RQ-7B Shadow UASs, three aerial weapons teams (or six Boeing AH-64 Apache attack helicopters), fixed-wing close air support, and the Guided Multiple Launch Rocket System—all available 24 hours a day. Unlike previous operations, Colonel Hort controlled the assets without having to go through intervening headquarters. Although most of these systems were used to engage JAM fighters or rockets, on occasion, large weapons (e.g., 500-pound guided bombs) were used to destroy buildings sheltering snipers. While other fights were taking place in Iraq and Baghdad, Colonel Hort's fight in Sadr City represented the main effort, and he had priority.[30]

The brigade executed a plan, developed in collaboration with MND-B, in which 3d Brigade Combat Team focused on JAM fighter and rocket teams, while the division continued key leader attacks of strategic importance to the government of Iraq, MND-B, and MNC-I. As was the case in other parts of the battle, the counter-rocket fight was a learning process. In his tactical operations center, Colonel Hort received continuous feeds from U.S. Air Force Predators (both armed and unarmed) and U.S. Army Shadow UASs. He also received information from Rapid Aerostat Initial Deployment (RAID) sensors, counterfire radars, and other ISR assets.[31] His battle staff integrated this information and communicated it to operational units down to the company level via a number of relatively new technologies. For example, they used Raytheon's Persistent Surveillance and Dissemination System of Systems (PSDS2) to integrate the various sensors. Addition-

[30] Hort interview; and David H. Petraeus, "CENTCOM Update, Center for a New American Security," briefing, 11 June 2009.

[31] See "The USA's RAID Program: Small Systems, Big Surveillance Time," *Defense Industry Daily*, 24 August 2011. The article states: "The RAID [rapid aerostat initial deployment] program is a combination of cameras and surveillance equipment positioned on high towers and aerostats, in order to monitor a wide area around important locations and bases."

ally, Colonel Hort was able to communicate in a secure chatroom environment via a secure Microsoft Internet Relay Chat (mIRC) client and to pass classified information via the Secret Internet Protocol Router Network (SIPR Net) down to the company level.[32]

All of these integrated sensors, communications systems, and strike assets gave 3d Brigade Combat Team the ability to find and kill JAM rocket teams and destroy other targets (e.g., mortars). Engagements happened in several ways. First, a radar or other sensor detected a rocket launch; a Shadow UAS was then vectored to the location of the launch and followed the target; and then finally, a Predator or Apache killed the target. Predators were particularly useful because JAM was expected to have SA-7 Grail MANPADS (man-portable air-defense systems) and the UASs enabled attacks on JAM without putting Apache crews at risk. Second, skilled intelligence personnel in 3d Brigade Combat Team headquarters were tasked with watching the ISR feeds on large screens in the tactical operations center. These individuals were dedicated scouts who observed the area under surveillance for enemy activity; when such activity was identified, the process of bringing assets to bear was initiated. Third, ground maneuver forces that detected JAM activity commenced the acquisition and attack processes. It is important here to note that the brigade commander and his battle staff had these resources pushed down to them—without intervening levels of command and authority—and could execute mission command. Higher echelons resourced the fight and managed the deeper operations beyond the brigade.[33]

Like the countersniper fight, the counter-rocket fight evolved over time. At first, rocket launch teams were attacked immediately after they had fired. However, the brigade battle staff soon developed tactical patience, realizing that it was likely hitting only low-level operatives with vehicles and launch rails. Eventually, the staff adopted a best practice of using an ISR platform to "watch the rail" and follow it. When the operatives returned to a supply point or a command location to get additional rockets and instructions, the staff saw the oppor-

[32] Hort interview; and Downing interview.
[33] Hort interview.

tunity to strike, hitting not only the operatives but higher elements of the network as well.[34]

Exploitation

MND-B exploited its success in neutralizing JAM with stability operations to secure Ishbiliyah and Habbibiya. These efforts intensified after al-Sadr declared a cease-fire on 12 May. Focused reconstruction efforts and information operations in those neighborhoods were intended to influence popular perceptions north of Route Gold as well. Even before fighting subsided completely, U.S. forces resumed applying relentless pressure against JAM's organization. As the reality of JAM's defeat became clearer, the area's inhabitants provided a flood of reliable intelligence that greatly facilitated this effort.[35]

As the battle subsided, two key realities became apparent to Iraqis living south of the wall along Route Gold. First, Iraqi Army and national police forces were in place and providing security. For residents, this hearkened back to pre–Operation Iraqi Freedom days, where Iraqis were in charge and not the Coalition forces who would eventually leave Iraq. Second, as security was restored to the area south of Route Gold, General Hammond, his subordinate commanders, and the reserve engineer brigade commander working for General Hammond, Brigadier General Jeffrey W. Talley, began an intense effort to improve conditions below the wall. Much of this effort was accomplished by enabling Iraqi small businesses, which gave Sadr City's population a stake in the new order. Thus, the population saw more permanent progress, and as conditions improved, the local citizenry became invested in maintaining their security and providing intelligence to Iraqi and U.S. forces.[36]

When, on 12 May, al-Sadr declared a unilateral cease-fire, it is likely that he was simply putting the best face possible on the existing situation. His forces had suffered huge losses, and key leaders had either fled or been killed. The population was growing restive, not only

[34] Hort interview; DiGiambattista interview; and Downing interview.
[35] Hammond interview; BGen Jeffrey W. Talley, interview with M. Wade Markel, Dallas, TX, 2 June 2010; and Gibby interview;
[36] Hammond interview; Talley interview; and Hort interview.

because JAM was perceived as provoking confrontations that resulted in civilian casualties but also because of JAM's depredations. On 20 May, unopposed elements of the Iraqi Army's 44th Brigade occupied the remainder of Sadr City.[37]

KEY INSIGHTS FROM THE FIGHT

The defeat of JAM in Sadr City during the six weeks of high-intensity operations yields several insights that bear highlighting:

- Protecting the population requires a balance between offensive, defensive, and stability operations.
- Persistent ISR, technical intelligence, and precision-strike capabilities enable the attacker to seize the initiative.
- Technical capabilities must enable decentralized decision making and small unit initiative.
- Isolating the enemy enables the counterinsurgent to seize the initiative.
- Ground maneuver remains indispensable for shaping the battle and achieving decision.
- Heavy armored forces have enduring utility in counterinsurgency and urban operations.
- Integrating SOF into conventional operations achieves synergy.
- Snipers remain an important enabler in urban operations.
- Enduring success depends on capable indigenous security forces.
- Urban counterinsurgency requires forces to transition rapidly between offensive, defensive, and stability operations.

REIMAGINING URBAN OPERATIONS AS WIDE-AREA SECURITY MISSIONS

Two general models for dealing with insurgent control of urban areas have become apparent in recent years. The first approach was taken by the Russian Federation in the Chechen city of Grozny in December 1999–February 2000 and the second by U.S. forces in the Iraqi city of

[37] Hammond interview; and Hort interview.

Fallujah in November 2004. Insurgents in these cities were viewed as cancers that had to be excised. In both of these cases, the cities were essentially besieged and then stormed, a course of action made possible by their geographic isolation. Noncombatants were told to leave before military operations within the cities commenced. Anyone who remained was, in general, viewed as a combatant in what became a block-by-block clearing operation supported by massive amounts of firepower.

Not surprisingly, both cities suffered significant damage. Additionally, casualties among Russian and U.S. forces were high. Although reliable figures are difficult to ascertain, the Russian Federation suffered at least 600 dead (mostly in Grozny) and likely many more wounded in Chechnya between December and early January. In Fallujah, U.S. forces suffered 70 dead and more than 600 wounded. Thus, this model of urban warfare anticipates and accepts extensive collateral damage and relatively high numbers of friendly casualties.

The 2008 Battle of Sadr City offers a second model for wresting control of a city from insurgents: treating an urban area as a wide-area security mission. In Sadr City, unlike in Grozny and Fallujah, telling the civilians to leave what was about to become a high-intensity battlefield simply was not feasible. Sadr City held 2.4 million residents, and there was nowhere for them to go. Sadr City is a suburb of Baghdad and, unlike Grozny and Fallujah, is not geographically isolated. These conditions in Sadr City may be representative of the future challenges of urban operations, and they will likely worsen as urban areas around the globe become more densely populated. The objective was not to take and clear Sadr City, but to create conditions that would make it both impossible for the insurgents to operate effectively and possible to restore security to the broader population.

Thus, in the Battle of Sadr City, the focus was on enemy fighters and their capabilities. U.S. forces deprived the enemy of the ability to affect events at the operational and strategic levels of war. JAM's control of Sadr City represents a perennial problem, but what made its March 2008 offensive problematic was JAM's ability to strike the Green Zone with indirect fires (mainly via rockets). Attacks on the Green Zone threatened to derail the al-Basrah offensive and thereby

reveal that the al-Maliki government was fatally ineffective. However, 3d Brigade Combat Team, 4th Infantry Division, took JAM's offensive capability away by employing determined ground maneuver, which combined infantry and armored vehicles, with support from pervasive ISR and precision-strike capabilities provided by UASs, attack helicopters, artillery, and close air support. Without its indirect-fire capability, JAM could only react locally as Coalition forces exploited human and technical intelligence to hunt down its remaining leaders under extremely one-sided conditions.

Finally, Sadr City demonstrates that one of the keys to fighting an urban adversary is to create a situation that forces the enemy to surrender the advantages of the city. This is the art of reimagining urban warfare, and it clearly has doctrinal, organizational, materiel, and training implications both for the U.S. Services and the Joint force. In the Battle of Sadr City, building the wall along Route Gold threatened to deny JAM access to key terrain and, as Colonel Hort related during an interview with the authors, "agitated the enemy." Quite simply, JAM had to contest the wall or face isolation. In the words of one U.S. officer, the wall was the equivalent of a Roman siege engine about to breach a city's defenses. It created a situation that was intolerable to JAM, and JAM had to come out and fight. In so doing, the enemy attacked U.S. forces that now had the initiative and were in a position of enormous advantage. JAM lost, and the Coalition victory in the Battle of Sadr City offers important lessons for the prosecution of future urban operations.

CHAPTER FOUR

ISIL's Territorial Logic of Urban Control in Mosul and ar-Raqqah

City as a System Analytical Framework

Erin M. Simpson, PhD

In March 2013, ar-Raqqah was the first Syrian provincial capital to fall to opposition forces in the rebellion against President Bashar al-Assad. By April 2013, the Islamic State of Iraq and the Levant (ISIL) was in direct competition with other opposition forces for control. The city's economy was badly affected by ISIL's actions to control the city. Following weeks of violent infighting, the city's infrastructure was paralyzed, with key economic infrastructure inoperative and no power, water, or health services available at the beginning of 2014. Unlike other insurgent groups, ISIL moved quickly to rebuild the city, seeing the value of the infrastructure in its ability to control ar-Raqqah's population. Within three months, water, electricity, and bread were readily available; schools and universities were reopened; and the private sector was functioning.

Understanding the relationship between armed groups and territory is one of the most critical and vexing aspects of any conflict. To analyze a group's military strategy, its systems of control, or its approach to political legitimization requires understanding the complex ways in which

it influences particular areas of human and physical terrain. Since ISIL's seizure of Mosul, Iraq, in June 2014, and its full takeover of ar-Raqqah by August 2014, international observers have grappled with how to understand the extent and importance of the territory it administers, denies to opponents, and infiltrates to attack.[1] Understanding how ISIL exists within its environment, both as it exists physically and as part of a system constituted through the interaction of other state and nonstate actors, is key to understanding both ISIL's continued military endurance against a multiplicity of foes and its evolving systems of political control emerging behind its front lines.

In contrast to models of classic Maoist insurgencies rooted in the study of remote rural areas, ISIL's military operations and political administration have focused on cities and the densely populated river valleys connecting them. For this reason, Caerus Associates' analysis of ISIL-held Mosul and ar-Raqqah applied the City as a System Analytical Framework to understand ISIL's relationship to the major urban centers under their control. The study, conducted roughly one year after ISIL's conquest of regime military facilities in ar-Raqqah, analyzed the interplay between local actors and their environment, compared the systems operating within Mosul and ar-Raqqah, and examined the broader regional "system of cities."[2]

Caerus's application of the framework revealed three environmental centers of gravity (E-COGs) that enabled ISIL to seize and hold

[1] Shortly after events unfolded in Iraq, news agencies and government leaders debated the proper use of ISIL versus ISIS. The Associated Press argued that "in Arabic, the group is known as Al-Dawla Al-Islamiya fi al-Iraq wa al-Sham, or the Islamic State of Iraq and al-Sham. The term 'al-Sham' refers to a region stretching from southern Turkey through Syria to Egypt (also including Lebanon, Israel, the Palestinian territories, and Jordan). . . . The standard English term for this broad territory is 'the Levant.' Therefore, AP's translation of the group's name is the Islamic State of Iraq and the Levant, or ISIL." However, many consider the term *Levant* dated: "If . . . 'al-Sham' means not only Syria, then there is a name for that: Greater Syria. When we use the older term 'Levant,' that should be used alongside the older name 'Mesopotamia' for Iraq. When you use modern 'Iraq,' use the modern term 'Greater Syria'—in that case, it's the Islamic State of Iraq and Greater Syria (still ISIS)." See Ishaan Tharoor, "ISIS or ISIL?: The Debate over What to Call Iraq's Terror Group," *Washington Post*, 18 June 2014. For the purposes of our discussion, we will be using the term ISIL.

[2] Mark Lomedico and Elizabeth M. Bartels, "City as a System Analytical Framework: A Structured Analytical Approach to Understanding and Acting in an Urban Environments," *Small Wars Journal* (2015).

the cities. First, ISIL's military forces' interior lines of communication allowed the organization to seize and move supplies from opponent stockpiles to evolving battlefronts to support new offenses in a reinforcing loop. Second, ISIL's trade activities through economic lines of communication that connect Mosul and ar-Raqqah together and to other ISIL-held areas weakened ties to the rest of Iraq and Syria, while funneling taxes to ISIL's coffers. The full study also assessed a third E-COG: ISIL's degradation of social and political E-COGs decreased opportunities for counter-ISIL mobilization, though this topic will not be addressed here.[3]

ISIL's military and political success in Mosul and ar-Raqqah is likely due as much to its approach to governance that focuses on the routes that connect urban nodes as to the nodes themselves. Enemy positions and civilian economies are seen as accumulators of goods that can be converted to logistical support to ISIL. As a result, the group designs campaigns to defend those routes and integrate those cities into the caliphate's military network and international economy. While the loss of a particular city, town, or village may diminish the volume of economic activity ISIL can tax, or prevent access to particular bases, few cities possess unique economic or military resources ISIL cannot access in its remaining territories. Though Mosul and ar-Raqqah each have unique symbolic importance, they are ultimately important as nodes between flows of personnel and military and economic materials. Consequently, this study does not focus on intracity issues, since the connections between cities were found to be more influential in shaping individual urban environments and the general environment in ISIL-held territory in Iraq and Syria.

Because ISIL's E-COGs are based on flows rather than particular urban nodes, ISIL can trade space for time, slowing down adversaries in major operations to encircle and clear population centers with little value to the organization. Meanwhile, ISIL has freedom of movement, which enables it to continue military operations and allow populations under ISIL control to continue most of their economic activities. So

[3] Dan Trombly and Yasir Abbas, "The Case for a 'Raqqa First' Strategy against the Islamic State," *War on the Rocks* (blog), 10 September 2015.

long as military approaches to ISIL center on the denial of specific nodes rather than the disruption of the interior lines (and the forces exploiting them) that allow ISIL to fluidly seize, lose, and regain them, ISIL's system of cities may not remain static, but it may prove durable.

CITY AS A SYSTEM STUDY APPROACH

This study was conducted using the City as a System Analytical Framework to guide analysis and assessment of the major urban centers under ISIL control. The framework consists of three primary steps: 1) define the urban operational environment, 2) frame and map urban problem systems, and 3) develop and analyze courses of action (COAs).

Step one produces an understanding of the current and historical state of the operational environment by defining significant characteristics of the urban environment using an ontology, then extending research to fill identified intelligence gaps using the urban triad framework of population, infrastructure, and terrain.[4] Step two of the framework focuses on identifying the elements of the problem system posed by ISIL's control over major urban centers. This involves the framework's FASCOPE (flows plus the civil affairs ASCOPE—or areas, structures, capabilities, organizations, people, and events) tool to identify problem system elements as different types of flows, nodes, and accumulators.[5] Finally, step three calls for the identification of E-COGs—that is the critical elements that enable or buttress the system as a whole, expanding the enemy-centric concept of a COG analysis to a multipolar system for a holistic systems analysis of the environment. This chapter focuses on three E-COGs—military lines

[4] For the purposes of this discussion, the term ontology can refer to an explicit specification of a conceptualization, although another definition points to a distinction between an ontology and a conceptualization, where an ontology is a logical theory accounting for the intended meaning of a formal vocabulary. The urban triad framework is based on concepts from *Joint Urban Operations* and defines the unique features of urban environments: population (political, military, economic, social, information, and infrastructure [PMESII]), infrastructure (sewage, water, electricity, academics, trash, medical, safety, and other considerations [SWEAT-MSO]), and physical environment and time (a subset of PMESII-PT). See *Joint Urban Operations*, Joint Publication 3-06 (Washington, DC: Joint Chiefs of Staff, 2013).

[5] *Civil Affairs: Tactics, Techniques, and Procedures*, Field Manual 3-05.401 (Washington, DC: Department of the Army, 2007), chapter 3.

of communication, economic lines of communication, and the degradation of centers of political resistance—revealed by consideration of the system as a whole to be critical to ISIL's success.

LINES OF COMMUNICATION AS AN ENVIRONMENTAL CENTER OF GRAVITY

Freely traversable lines of communication, the flows that allow military personnel and equipment to travel between critical points, whether they are strategic nodes such as cities or accumulators such as logistical hubs, are an E-COG critical to ISIL's military strategy. While flows of government and other insurgent forces also use these pathways, ISIL's logistics and tactics make them particularly dependent on the infrastructure that supports the flow of military personnel and resources. ISIL depends on raiding hostile units, checkpoints, bases, and stockpiles to gain critical military supplies. They also rely on the ability to move forces between fronts as part of their campaign of interior lines. Hence, pathways that allow military supplies and forces to flow between locations support a reinforcing loop in which ISIL relies on the capture of equipment and supplies to sustain its offensive activity, which in turn enables ISIL to seize more equipment and supplies (figure 4.1). As a result of this feedback loop, limiting ISIL's military power will require interrupting these flows to break the reinforcing cycle (figure 4.2).

Freely traversable lines of communication, including major roads, back roads, smuggling tracks, canals, rivers, and other means of transportation are critical features for ISIL, other armed groups, and state forces alike. However, not all actors can use these features with equal ease. Because ISIL's attacks rely on small units that meet most

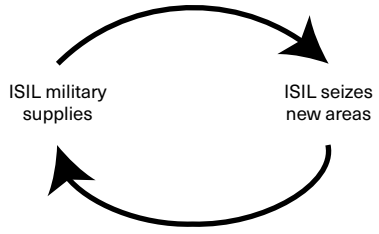


Figure 4.1 Reinforcing loop dependent on the flow of military supplies and fighters. *Illustration by MCUP*

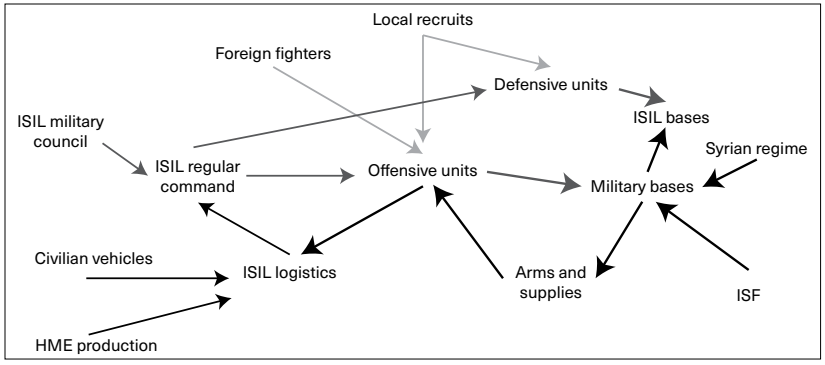


Figure 4.2 Reinforcing loop of base raiding in ISIL's military structure and logistics. *Illustration by MCUP*

of their mobility needs with commercial vehicles, it has an advantage in using this transportation infrastructure (or lack thereof) relative to conventional military units.[6] Such organizations are more dependent on well-maintained road infrastructure. Large, mechanized formations of heavy vehicles are particularly vulnerable to interdiction and harassment by improvised explosive devices (IEDs) and mobile forces. As a result, ISIL moves its forces faster than their opponents are able to mobilize defenses.

ISIL takes advantage of its relative freedom of movement in this environment by making maneuver across its theaters of operation a key element of its military approach. Rapid redeployment allows ISIL to meet its military needs across geographically dispersed fronts. Mobility also allows ISIL to compete against multiple opponents that cumulatively possess more raw manpower and equipment than ISIL, but who are often at a disadvantage locally as ISIL creates new fronts and extends lines of communication. Because ISIL fights so many opponents, it cannot afford to mass its units in a prolonged campaign against one enemy without leaving a disparate front open to attack from another, or giving others time to patch their own defenses and recuperate from previous defeats. Without highly mobile units, ISIL could neither repel simultaneous or near-simultaneous hostile offen-

[6] In this instance, we refer to FASCOPE's arms and capabilities.

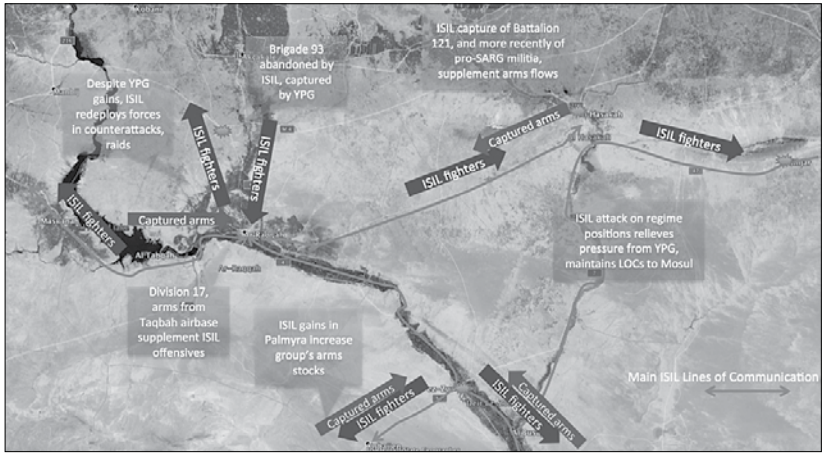

ISIL capture of Battalion 121, and more recently of pro-SARG militia, supplement arms flows
Brigade 93 abandoned by ISIL, captured by YPG
Despite YPG gains, ISIL redeploys forces in counterattacks, raids
ISIL fighters
ISIL fighters
ISIL fighters
Captured arms
ISIL fighters
Captured arms
ISIL fighters
ISIL attack on regime positions relieves pressure from YPG, maintains LOCs to Mosul
Division 17, arms from Taqbah airbase supplement ISIL offensives
ISIL gains in Palmyra increase group's arms stocks
Captured arms
ISIL fighters
ISIL fighters
Captured arms
Main ISIL Lines of Communication

Figure 4.3 Major movements of ISIL personnel and captured weapons in vicinity of ar-Raqqah, 2014–15.
Department of State

sives, nor easily exploit temporary vulnerabilities that may appear in its opponents' lines.

ISIL's mobility stands in marked contrast to the slow-moving and often static approach of its opponents, especially the Iraqi and Syrian regimes and the paramilitaries supporting them. Iraqi Security Forces (ISF) and Syrian regime force deployments, in the defensive, focus on static nodes to project security, relying on military bases, checkpoints, and other fixed defensive structures and positions. As individual nodes, these positions work somewhat effectively to control the movement of the civilian population or to suppress localized actions by relatively poorly armed and poorly organized hostile forces. State-constructed defensive positions in Iraq and Syria tend to be co-located with major population centers, either within them or on the outskirts.

While the idea of locating bases and checkpoints to ensure influence over accumulations or flows of people is logical, these positions are often ill-suited to repel flows of hostile forces, especially well-designed and well-equipped assaults by mobile forces (figure 4.3). The positions are not laid out to provide mutual support during heavy com-

bat. When manned with forces that are unwilling or unable to move, to contact, or to fight outside of prepared positions, mobile forces can easily isolate and defeat these static forces in detail, inflicting heavy casualties and blows to morale that may induce collapse before all positions are even in contact. Location in or near concentrated flows or accumulations of people may prove advantageous for providing low-level popular security, but this strategy also colocates these positions near routes that a mobile force can exploit to isolate and seize.

ISIL's capture of Mosul illustrates the ideal demonstration of their mobility-centric approach. In Mosul, ISIL did not need to systematically clear the city in June 2014. It overran checkpoints with rapid assaults and superior firepower before attacking ISF unit headquarters and other positions on the city's western bank, surrounding and isolating ISF units there. On the eastern side of the Tigris River, other ISF units were unwilling to leave their bases on the east bank for the heavy combat in western Mosul. As a result, efforts to fall back to the east and regroup proved futile and turned into a retirement by forces in eastern Mosul.

The defeat of Syrian regime units in ar-Raqqah in the weeks after the fall of Mosul followed a similar pattern. Although the Syrian government held onto multiple defensive positions, they were isolated and unable to effectively coordinate a defense. ISIL targeted the headquarters of 17th Division, immediately north of the city, and seized it after heavy fighting. Although some personnel from the 17th Division's Army base escaped to the 93d Brigade's base near Ayn Issa or the airbase at al-Tabqah to the southwest, retreating soldiers were demoralized and frequently unable to defend themselves from fast-moving ISIL raids or ambushes. ISIL seized the 93d Brigade's base and enveloped the al-Tabqah airbase, subjecting it to sustained bombardment and infantry assaults for about two weeks before ISIL breached and seized the facility.

In both Mosul and ar-Raqqah, ISIL's mobility allowed it to isolate static positions and mass sufficient firepower and forces to destroy state positions one by one. Yet, without free access to the lines of communication (LOCs) linking Mosul and ar-Raqqah, these sequential victories would have been difficult. ISIL needed to move forces from Syria

to take Mosul, and move forces from northern Iraq to overrun regime bases in ar-Raqqah. Access to LOCs between and around Mosul and ar-Raqqah did not simply provide the possibility of sequential offensives across multiple fronts—it allowed each successful seizure of a hostile position to reinforce rather than distract from the possibility of offensive operations elsewhere. Weapons captured from Mosul bolstered offensive operations in ar-Raqqah, and weapons captured from Syrian bases in ar-Raqqah bolstered the next round of ISIL actions.

In addition to supplying military victories, ISIL's mobility facilitates a raid-based logistical system, where ISIL's offensive forces and the weapons they capture travel from node to node across transnational LOCs. ISIL's opponents, by accumulating static forces in nodes accessible through these LOCs, sustain ISIL's logistical model by deploying their forces in a manner that fails to significantly impede ISIL's mobility while still offering opportunities to seize new equipment (see figures 4.1 and 4.2).

As open source surveys of ISIL's equipment demonstrate, arms flow is dependent on weapons seized from the stockpiles of rival factions, especially those with a conventional military posture. ISIL has a relative deficit in access to arms trafficking compared to other regional militant groups. It does not directly control major border crossings (beyond its interior Iraq-Syria border), and it lacks a state sponsor to facilitate transfers of large quantities or advanced types of weapons. Instead, ISIL depends on small arms, light weapons, crew-served vehicle-mounted systems, artillery, and armor; all of which are easily moved from newly captured locations by infantry, technicals, or in extreme cases, heavy equipment transporters (HETs).

ISF and Syrian regime force deployments focus on military bases, checkpoints, and other fixed defensive structures and positions. While the Syrian and Iraqi governments see these fixed locations as important nodes to secure control over territory, ISIL views these locations as accumulators of arms and supplies that can be raided. While rival nonstate actors are less dependent on conventional military infrastructure and thus a less attractive target for raids, ISIL's use of tube-launched, optically tracked, wire-guided (TOW) missiles provided to Syrian rebel groups shows that ISIL does benefit from rival groups'

arms as well. As a result, as long as ISIL maintains freedom of movement, they will not only be able to attack but will also gain strength from these fixed accumulations of supplies.

In the case of cities, ISIL has shown itself willing to invest in more substantial defenses, but it also has been willing to retreat strategically to preserve forces for combat operations elsewhere. Although the core of ISIL's combat capability consists of mobile units, ISIL will construct fixed defenses in its territory where it has the resources available. ISIL repelled two ISF offensives in Tikrit, Iraq, with the aid of purpose-built fighting positions and IED minefields.[7] In Mosul, ISIL has constructed a "caliphate wall" and numerous fighting positions and defenses around major avenues of approach to the city.[8] ISIL's combat engineering frequently commandeers construction equipment to build large IED fields and defensive structures. However, these defenses seemed designed less to ensure territory is held than to delay enemy forces or channel them to specific, highly defended routes, ensuring time for the bulk of ISIL's forces to move out of the threatened area while still inflicting damage.

ISIL used this strategy to great effect in the final ISF and militia assault on Tikrit in spring 2014, delaying ISF forces by destroying critical bridges, laying extensive fields of IEDs, and using snipers and other harassment tactics to make ISF advances slow and bloody. Soon after, ISIL forces massed in Baiji District, which ISIL nearly overran, forcing the ISF to further delay plans for a retaking of Mosul. Baiji also served to distract the ISF, allowing ISIL to overrun ar-Ramadi soon after the fall of Tikrit. ISIL has used similar tactics to mitigate its losses in Syria. In their fight with the Kurdish People's Protection Units (YPG), for example, ISIL chose to retreat from Tell Hamis and Tell Brak in southern al-Hasakah Province earlier this year, only to attack areas near Ras al-Ayn and Tall Tamr in the northeast of the province. Another recent example is ISIL's retreat from Tell Abyad in northern ar-Raqqah Province, an important city bordering Turkey, without a fight,

[7] Bill Roggio, "Iraqi Troops, Insurgents Battle for Tikrit," *Long War Journal* (2014).
[8] Abdelhak Mamoun, "Urgent: ISIS Builds 'Caliphate Wall' around Mosul," *Iraqi News,* 18 March 2015.

only to conduct several offensives and raids in al-Hasakah and Kobani. As a result, even defensive structures seem designed to enable the flow of fighters and equipment between fronts.

If LOCs are open, raiding on another front can enable the defense of a city by providing new military equipment to ISIL and diverting the attacking force. When YPG forces, backed by Coalition airpower, made gains in Aïn Issa, Lebanon, and other areas near ar-Raqqah, ISIL launched an infiltration attack on Kobani that killed large numbers of civilians, putting pressure on the YPG to redirect more resources to internal security.[9] It also attacked Syrian regime positions in al-Hasakah city, capturing new weapons and replacing a previously stable front between the YPG and the regime with another front in danger of attack from ISIL. ISIL may prioritize preserving forces to raid for supplies and conduct counterattacks over holding the maximum possible extent of territory.

ISIL relies on freedom of movement to shift fighters and supplies between disparate territories, enabling the group to raid rivals' supplies and achieve military victories. By turning military success against well-armed opponents into a reinforcing logistical loop, ISIL's enemies' actions form part of an E-COG that allows ISIL to sustain its combat capabilities. Moreover, ISIL only needs to temporarily win territory to receive these benefits. As long as needed supplies and fighters continue to flow to other fronts, the loss of urban nodes can be seen as a temporary setback.

TRADE FACILITATION AS AN ENVIRONMENTAL CENTER OF GRAVITY

Since June 2014, new economic flows, enabled and shaped by ISIL, emerged in ISIL-held areas, creating new economic relationships between ar-Raqqah and Mosul. ISIL's facilitation of commercial mobility and trade through a consistent, unobtrusive system of regulations, checkpoints, and taxes generates revenue for the organization.

[9] Schams Elwazer et al., "ISIS Militants Disguised as Kurdish Fighters Infiltrate Syrian Town," CNN, 25 June 2015.

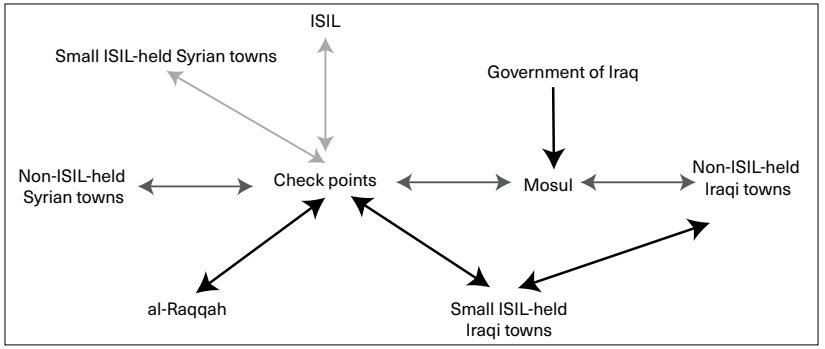


Figure 4.4 Economic system of ISIL.
Illustration by MCUP

Involvement in trade also promotes ISIL's legitimacy by benefiting local traders while preventing the rise of trade organizations that could pose a threat to the organization's rule. Finally, and perhaps most importantly, ISIL's economic policies facilitate internal trade between ar-Raqqah and Mosul, while using opponent restrictions on freedom of movement and regulation to discourage trade with rival actors.[10] This has served to create a coherent internal economy between ISIL-held areas (figure 4.4).

A comparative analysis of FASCOPE demonstrates that, although ISIL's checkpoints are an important means of monitoring the population under its control, they are far less elaborate than those ISF and other forces use. Checkpoints run by conventional state actors are designed to intercept small militant units or IED attacks. As a result, conventional checkpoints require exhaustive searches and cataloging of civilian movement. The length of the searches required to prevent the transit of bombers or other clandestine attackers results in large delays for civilians, exacerbating the strain checkpoints place on the civilian population. For example, ISF checkpoints require large units of police or military personnel with extensive use of concrete barriers

[10] Jessica Stern, "ISIL and the Goal of Organizational Survival," in *Beyond Convergence: World Without Order, ed. Hilary Matfess and Michael Miklaucic* (Washington, DC: Center for Complex Operations, National Defense University, 2016), 195–214.

designed to mitigate the possibility of a suicide vehicle-borne improvised explosive device (SVBIED) or other forms of attack.[11] A resident in Mosul said in an interview that it took him nearly one hour to drive less than two miles to work because of an ISF checkpoint in Mosul City.[12] Worst of all, checkpoints could provide a mechanism for corrupt members of security forces to extract revenue from the population.[13]

In contrast, ISIL's different security needs and its potent counterintelligence capability mitigate its reliance on checkpoints. ISIL removed ISF checkpoint barriers to ease civilian's freedom of movement immediately following its seizure of areas in Mosul and other parts of Iraq. ISIL also very publicly dismantled border checkpoints that previously restricted cross-border transit between Iraq and Syria, enabling commerce rather than restricting it. ISIL uses a handful of fighters on motorcycles or small cars to man checkpoints on major highways, and similarly small numbers can regulate the flow of civilians within major cities. ISIL's checkpoint system is far less cumbersome for civilians than those of other forces. As a result, ISIL has gained a reputation for facilitating inter- and intracity flows of goods, at the same time as it has reduced the number of forces needed to hold cities, allowing them to support other missions.

Similarly, ISIL's commercial regulations seek to promulgate predictable patterns of commerce and to decrease the role of the black market in areas under its control.[14] Unlike most of ISIL's rivals, to include the Iraqi government and the Syrian regime, ISIL checkpoints and other bureaucrats are generally less corrupt, exacting a regularized, reliable tax that facilitates commerce. The majority of ISF, regime, and opposition groups' checkpoints remain corrupt, often forcing merchants to pay bribes at each checkpoint they pass through. With ISIL, merchants pay only once: ISIL checkpoints issue payment receipts

[11] For more on security issues at the time, see *Iraq Situation Report: October 23–24, 2014* (Washington, DC: Institute for the Study of War, 2014).
[12] Kirk Semple, "Back and Forth, Wearily, Across the ISIS Border," *New York Times*, 20 September 2014.
[13] For more on civilian security, see *Protection of Civilians in Mosul: Identifying Lessons for Contingency Planning* (Washington, DC: Center for Civilians in Conflict, 2017).
[14] *ISIL Finances: Future Scenarios* (Washington, DC: ISIL Finance Team, Director of National Intelligence, 2016).

for merchants and drivers moving through or within its territories to prevent tax duplication. Because merchants can anticipate the fees and restrictions, they see more regular and predictable profits. ISIL's limited regulations, combined with their clandestine surveillance and harsh punishments for violations, also disincentivizes black market commerce. These actions further buttress their legitimacy.[15]

Promotion of trade also reduces the power of local actors within major population centers, such as ar-Raqqah and Mosul. Consumer-driven demand and the ability to trade from city to city diminishes the leverage of individual merchants. Furthermore, low barriers to entry due to ready access to transportation to move goods from areas of relative high supply to relative high demand, and the decentralized nature of trade in consumer goods, reduces incentives for merchants to work together to enhance their bargaining power. Moreover, economic actors in Mosul, ar-Raqqah, and other ISIL territories generally consist of large classes of people from varying localities and backgrounds, with little history or experience of exercising political power collectively. As a result, few identifiable alternative centers of economic power exist to challenge ISIL or limit the scope of its capabilities. Taxing decentralized economic activity allows ISIL to generate revenue without creating codependency with powerful actors that might use countervailing leverage against it.

Geospatial mapping of these trends reveals that, beyond expanding ISIL's reputation as a capable governing force, ISIL's facilitation of trade, in combination with severed LOCs by its rivals, have shifted patterns of trade and reinforced ISIL's claims to rule a coherent state. While travel restrictions are a rational response to oil smuggling, growing numbers of refugees, and security concerns facing the Iraqi and Kurdish governments, severing the LOC creates distance between Iraqi towns under ISIL control and their traditional trading partners.[16]

[15] Tim Arango, "ISIS Transforming into Functioning State that Uses Terror as Tool," *New York Times*, 21 July 2015.

[16] Dalshad Abdullah and Layal Abu Rahal, "Kurdish Security Service Takes Aim at ISIS Oil Smuggling," *Asharq Al-Awsat*, 30 July 2014; Barbara Slavin, "U.S. Official Claims Gains in Curtailing IS Oil Smuggling," *Al-Monitor*, 8 December 2014; and Raja Abdulrahim, "Sunni Arabs Feel Sting of Discrimination in Northern Iraq," *Los Angeles (CA) Times*, 20 October 2014.

For example, Mosul is traditionally integrated with the Iraqi-Kurdistani regional economy; however, ties between the cities have been severed.[17] As a result, ISIL-held towns grow increasingly dependent on one another. For example, al-Hawija, traditionally more integrated with geographically proximate Kirkuk, has increasing ties to Mosul as roads to Kirkuk have been blocked by government and Kurdish forces.[18] As a result, traditional intra-Iraqi trade flows have eroded, and new connections within ISIL-held areas are being formed.

At the same time, ISIL's economic policies have increased trade between Mosul and other ISIL-held areas, especially with ar-Raqqah. As a result, Mosul is now far more integrated with the Syrian economy than it is with Erbil in Iraqi Kurdistan, let alone Baghdad and central Iraq. Residents of Mosul benefit from access to cheaper food and manufactured goods produced in ar-Raqqah and other Syrian cities at a lower cost than goods from Iraq and those imported from Turkey through ISIL-held Syria. For example, prices of food plunged after ISIL's takeover of the city as cheap agricultural food supplies from ar-Raqqah flooded into Mosul markets. This price disparity has endured, as local residents in Mosul reported lower food prices compared to the rest of Iraq.[19] The closure or aerial targeting of government industries in Mosul has exacerbated Mosul's dependence on Syrian clothing, fabric, and food.[20] While access to some medications and sophisticated manufacturing goods have been impacted by the loss of trade with Baghdad and Erbil, the advantages of cheap Syrian goods outweigh the hardships for many residents of Mosul.

Increased trade between Syrian and Iraqi towns also benefits Syrian merchants. Iraqi residents have a much higher purchasing power than Syrians, in part due to Iraqi government payments to em-

[17] See "Mosul: ISIL's Economic Engine," Rand.org.

[18] A one-way ticket from al-Hawija to Kirkuk increased from 8,000 dinars before July 2014 to 1 million Iraqi dinars as of June 2014, according to a resident in Kirkuk interviewed by Caerus.

[19] Rwa Haider, "What Has ISIL Done to Mosul's Residents Since June 2014?," Radio Free Iraq, 6 April 2015.

[20] Khales Joumah, "The New Masters of the Market: Syrian Traders Flock to Mosul for Iraqi Profits," *Niqash*, 18 June 2015.

ployees and pensioners from oil exports.[21] Trade with Mosul offers high profits to Syrian merchants, who make the eight-hour journey from ar-Raqqah. This makes Iraq an attractive market for Syrian merchants operating in conflict-affected areas with limited hard currency available.

Similarly, ISIL exerts influence over the production and sale of oil through its control of LOCs between oil-producing areas and major population centers. As analysis of the fuel trade demonstrates, the seizure of the Deir Ezzor oil fields and refineries from Jabhat al-Nusra (or al-Nusra Front) in mid-2014 put ISIL in command of a critical flow of resources. ISIL control over the roads between the Deir Ezzor oil fields and population centers in ar-Raqqah, Mosul, and al-Anbar solidifies ISIL's influence over merchants, who now pay taxes to ISIL for access to the lucrative oil trade. At the same time, the destruction of the Baiji refinery, the loss of oil fields near Tikrit, and the disruption of the fuel trade between Baghdad (and Erbil) with Mosul, forces Moslawis (citizens of Mosul) to depend on ISIL for petroleum products. ISIL now dominates the oil trade to such a degree that rival Syrian opposition groups, Iraqi Kurds, the Syrian regime, and civilians living in Jordan or Turkey are forced to engage in trade with oil merchants in ISIL-held territories. Inability to meet local fuel needs spurred bottom-up demand from civilian buyers and top-down complicity from governing actors. As a result, the oil trade adds tax revenue to ISIL's coffers, ensures preferential access to a critical supply to ISIL military units and civilians, and provides leverage over major opposition forces.[22]

At the same time, ISIL also has disincentivized trade between ISIL-held areas and areas controlled by rivals. ISIL restricts exports produced in its territories to force merchants to engage in more trade within ISIL-held areas. In Mosul, for example, roads to the south and east are closed to local merchants and farmers, restricting trade to ISIL held areas.[23] In ar-Raqqah, ISIL imposes high taxes on particu-

[21] A government employee in Syria makes an average of $132, whereas an Iraqi employee's average salary is approximately $500. Also see "Mosul: ISIL's Economic Engine."
[22] Nour Malas and Maria Abi-Habib, "Islamic State Economy Runs on Extortion, Oil Piracy in Syria, Iraq," *Wall Street Journal*, 28 August 2014.
[23] Semple, "Back and Forth."

lar goods traveling from its territories to opposition and regime areas. Farmers in ar-Raqqah, for example, pay an additional 25 percent tax to ISIL if they want to sell their products to the Syrian regime. Similarly, while ISIL does allow oil to be exported from its territory, it restricts importing fuel from the outside, forcing local merchants to only deal in ISIL-produced oil. Although ISIL is willing to export fuel products across battle lines, mainly to buyers in rival Syrian rebel groups and regime territory, it is more reluctant to import them. In al-Hasakah Province, ISIL has restricted importing oil products from YPG-held territories, cutting off the YPG's ability to export oil to Arab Syria, and has increased ISIL crude oil sales. These actions resulted in more internal trade and economic autonomy of ISIL-held areas.[24]

Taken together, ISIL's facilitation of trade through open LOCs and predictable regulations are reorienting the cities under its control to form a more coherent, integrated economic unit. As Mosul becomes increasingly disconnected from Iraq both physically and economically, Mosul and other ISIL-held areas in Iraq have become more integrated with each other and with ISIL holdings in Syria. This new relationship gives ISIL a golden opportunity to not only legitimize its transnational caliphate, but to use the new relationship between ar-Raqqah and Mosul to finance its governance and military operations.

LOOKING FORWARD

Territorial size and control have been important metrics for actors fighting ISIL and international observers. Without understanding the territorial logic of ISIL strategy and governance, however, anticipating the effect and assessing the significance of territorial changes will prove difficult. Understandably, many assessments of ISIL territory focus on the size or population of areas under ISIL control. ISIL's strength is frequently assessed through its ability to seize and hold major cities. This is undoubtedly of value but should not overshadow that the ways in which cities matter to ISIL is distinct from the way they matter to the governments of Iraq and Syria or rival nonstate actors.

More than any particular piece of territory, ISIL seeks to sur-

[24] *ISIS Financing, 2015* (Paris: Center for the Analysis of Terrorism, 2016).

vive. Fighting against multiple opponents and dependent on a steady stream of post-victory looting, ISIL has sought to create a territorial system that allows it to sustain a multifront war but also remain resilient during inevitable territorial losses. By contrast, some rival actors, such as the Iraqi government, orient the objectives of military campaigns around major cities, methodically isolating and then assaulting them, with great symbolic value assigned to capturing a city proper even as ISIL forces remain active in the immediate environs.

By facilitating military and civilian mobility, ISIL has increased interdependence and mutual support between areas under its control, making its territories more resilient in the face of the isolate, besiege, and assault playbook of its major military opponents. ISIL cannot hold all the population centers it takes, but it can make military operations to retake them costly enough for a given opponent so as to buy time to replenish itself through operations elsewhere and to make the spoils of capturing the city negligible. Although this model, based on plunder, scorched earth, and the facilitation of regional trade necessitated by dislocation and hardship may diverge from other models of state building, it has allowed ISIL to campaign and govern an environment that other actors have found difficult to stabilize and control.

CHAPTER FIVE

Distributed Influence

Enabling Maneuver in a Megacity

Major Jonathon T. Frerichs, U.S. Marine Corps

Long considered the fathers of sea power and maritime strategy, Alfred T. Mahan and Julian Corbett's opposing theories—strategy, big battles, and command—may now be applied to the approach to modern challenges with urban combat. In the 1980s and '90s, Colombia's second-largest city—Medellín—became a war zone and the center of Pablo Escobar's drug cartel. Military crackdowns in the early 2000s ended the violence, and peace agreements in late 2003 demobilized and offered amnesty to the illegal armed groups. Conversely, Russia in the mid-1990s believed that taking the Chechen capital of Grozny in a significant show of force would mean an early end to the war. Lasting several months, the fight left the city devastated and casualty numbers high. Russia's tactics may have at first succeeded, but they ultimately lit a fire of rebellion under the Chechen separatist forces, who would eventually retake the city.

DEFINING THE PROBLEM

Why Prepare for a Conflict in a Megacity?

The United States military is not prepared to fight in a megacity. The *National Security Strategy* of 2010 states that "globalization has also intensified the dangers we face—from international terrorism and the

spread of deadly technologies, to economic upheaval and a changing climate."[1] This globalization includes an increasing proportion of the population and wealth consolidating inside dense urban areas. While the U.S. military may not want to become embroiled in a megacity conflict, the U.S. president may decide that American involvement is required to protect national interests.[2] History demonstrates that the United States will fight wherever necessary to secure and protect its enduring interests. Whether to counter a direct threat, such as a terrorist cell in a megacity that threatens U.S. citizens or allies or to reinforce a failing megacity of an allied partner to promote peace and security, U.S. involvement in a megacity is a necessary scenario for which to plan.[3]

If military involvement in a megacity is likely for future conflicts, why are U.S. forces unprepared for a conflict in a megacity? Most planning processes start with understanding the problem. The U.S. military is not prepared for a megacity conflict, because it does not possess a valid operating concept to achieve unified action. From the military framework of joint operational planning, the process of operational design should drive the operational approach. The design process should answer three key questions: Where are we? (i.e., the current situation); What is the problem?; and Where do we want to go?[4]

Where Are We: Defining the Operating Environment

As defined by the 2014 U.S. Army study on megacities, the term *megacity* is defined as having a population of 10 million or more. By this definition in 2017, the number of megacities in the world increased to 37, and by 2030 there will be more than 40.[5] Several different frame-

[1] *National Security Strategy* (Washington, DC: White House, 2010), i.
[2] Steven Metz, "Strategic Horizons: How the U.S. Military Might Get Involved in a Megacity," *World Politics Review*, 19 March 2014, 1-1.
[3] Metz, "Strategic Horizons," 2-2.
[4] *Joint Operation Planning*, Joint Publication (JP) 5-0 (Washington, DC: Joint Chiefs of Staff, 2011).
[5] *Megacities and the United States Army: Preparing for a Complex and Uncertain Future* (Washington, DC: Chief of Staff of the Army, Strategic Studies Group, Department of the Army, 2014), 3; and Tanza Loudenbach, "Here's How Much It Would Cost You to Live in the 10 Largest Megacities around the World," *Business Insider,* 20 October 2017.

works exist to facilitate understanding of an operating environment. PMESII-PT (political, military, economic, social, infrastructure, information, physical environment, and time) is a common framework used by the military. However, the military has an inherent problem with its ability to define the operating environment of a megacity. The military does not have the expertise to fill in the blanks for the different elements of this framework because of the complexity of a megacity. For example, the military does not have the technical expertise to understand the physical and social infrastructure for a megacity. The density, connectedness, and ever-changing nature of a megacity preclude a clear understanding of these elements by a standard military staff.

What Is the Problem?

Military staffs plan by researching their environments and defining problems. The U.S. Army study on megacities identifies that the traditional reductionist method of identifying the problem is not sufficient for the complexity of operating in a megacity.[6] The interconnectedness and complexity of a megacity does not allow the problem to be reduced. The study suggests that to understand the problem, an appreciation for the characteristics of a megacity (context, scale, density, connectedness, flow, and threat profile) must be combined with an appreciation for the drivers of instability and capacity.[7]

Where Do We Want to Go?

National strategic objectives will drive megacity operations. These objectives require collaboration, synchronization, and coordination with interorganizational partners.[8] A 2013 report on joint operations and best practices states, "We continually hear our operational commanders saying that they cannot achieve strategic objectives solely through military action, but must depend on the full government team to achieve success."[9] Maneuvering toward a desired state must inte-

[6] *Megacities and the United States Army*, 10.
[7] *Megacities and the United States Army*, 11.
[8] *Interorganizational Coordination*, JP 3-08 (Washington, DC: Joint Chiefs of Staff, 2016).
[9] *Joint Operations: Insights and Best Practices*, 4th ed. (Suffolk, VA: Deployable Training Division, Joint Staff J-7, 2013), 2.

grate and synchronize all elements of national power to achieve any strategic objective.

Why Is the U.S. Military Unprepared?

Current urban warfare concepts fail to set the conditions for maneuver by military forces in a megacity. The *Capstone Concept for Joint Operations: Joint Force 2020* provides a vision from the chairman of the Joint Chiefs of Staff of how the U.S. military will secure and protect national interests in the future. In the introduction, the chairman "recognizes [that the military] is only one element of national power . . . success will turn on our ability to operate with other allied governments and their armed forces, and nongovernmental partners."[10] The concept paper highlights "integrated operations" that involve a network of forces and partners.[11] While integrated operations sound promising, it focuses only on interagency coordination—not interorganizational coordination.

With a nuanced difference, interagency coordination is framed from the Department of Defense (DOD) perspective, relegating the problem to a military perspective. As previously stated, the military does not have the capacity to independently achieve strategic objectives in a megacity conflict. Interorganizational coordination frames problem-solving from a whole-of-government approach, including foreign governments and military forces, intergovernmental organizations, and nongovernmental organizations (NGOs). Unity of effort from a DOD perspective can be achieved through interagency coordination. However, to achieve unified action in a megacity conflict, the military must participate in interorganizational coordination. The United States will only be successful in a megacity conflict through unified action to methodically affect the system.

KEY DEFINITIONS

- **Expeditionary force**: an armed force organized to accomplish a specific objective in a foreign country.

[10] *Capstone Concept for Joint Operations: Joint Force 2020* (Washington, DC: Joint Chiefs of Staff, 2012), 1.
[11] *Capstone Concept for Joint Operations*, 4–8.

- **Unity of effort**: coordination and cooperation toward common objectives, even if the participants are not necessarily part of the same command or organization—the product of successful unified action.
- **Unified action**: the synchronization, coordination, or integration of governmental and nongovernmental activities with military operations to achieve unity of effort.
- **Interagency coordination**: within the context of DOD involvement, the coordination that exists between its elements and engaged U.S. government agencies to achieve an objective. The key here is "within the context of DOD." Interagency coordination allows for unity of effort from DOD, but not unified action from all the other players who are critical to achieving their strategic interests.
- **Interorganizational coordination**: the interaction that occurs among elements of the DOD; engaged government agencies; state, territorial, local, and tribal agencies; foreign military forces and their government agencies; intergovernmental organizations (IGOs); NGOs; and the private sector.
- **Control**: physical or psychological pressures exerted with the intent to assure that an agent or group will respond as directed.[12]

KEY ASSUMPTIONS

The assumptions below provide an initial frame for understanding the problem of maneuvering in a megacity. Paramount to this discussion, a conflict in a megacity will occur. And while conflict in a megacity is not desirable, this assumption is critical to initiate planning.

- Conflict in a megacity will occur, resulting in American engagement.
- The drivers of instability and the root causes of the problem in a megacity are not apparent. If they were apparent then the conflict could be easily resolved or reconciled.

[12] *DOD Dictionary of Military and Associated Terms* (Washington, DC: DOD, 2018).

- Control is not possible. *Joint Urban Operations* states that a fundamental step of operations in urban terrain is to "establish and extend control and protection of urban sectors and subsystems."[13] The complexity and interconnectedness of a megacity defies control (in accordance with the joint definition), so nothing can be assured.
- Similar rules of engagement (ROE) under which the U.S. military currently operates will apply, at least until vital national interests are threatened by a force that cannot be managed based on the current ROEs. For the purposes of this discussion, the cure cannot kill the patient (i.e., preventing total destruction of a city as a course of action).

LITERATURE REVIEW AND FRAMEWORK ANALYSIS

Historical Perspective: Another Large, Complex Operating Environment

Have the U.S. government and the military experienced the problem of operating in a large, complex, and unknown operating environment before? Let us consider those operating in the open seas in the late 1800s and early 1900s. Their similarities include an increasing globalization and connectedness, size (relative), and the lack of clear doctrine. The two most notable theorists of the time—American naval officer and historian Alfred T. Mahan and British naval historian and geostrategist Julian S. Corbett—developed two theories applicable to conflict in a megacity. Mahan argued for control of the sea by massing strength at decisive points to neutralize the enemy fleet, for only through destruction of the enemy fleet could a country gain control of the sea.

In contrast, Corbett argued that the sea was not susceptible to ownership. He proposed that only local superiority could be gained through securing lines of communication (LOCs) as required to enable commerce and transit. Additionally, he argued that massing

[13] *Joint Urban Operations*, JP 3-06 (Washington, DC: Joint Chiefs of Staff, 2013), I-11.

forces only provided the enemy with an easier target.[14] The megacity concept lends itself to similar theories where we must consider the United States massing and destroying the enemy at a decisive point, or where the scale and complexity of the megacity lends itself better to an operating concept that secures key LOCs to enable other action.

Complexity

Megacities are complex and no source of literature denies this claim. The U.S. Army study on megacities states: "The nature of each megacity's complexity makes it unique. No two cities exhibit the same emergent properties, or are connected (internally or externally) in the same way."[15] Case studies of individual megacities identify that each city has unique, individual complexities. Additionally, the cities are ever changing and adapting. In *Out of the Mountains*, counterinsurgency expert David Kilcullen discusses rapid urbanization and increasing connectedness as key factors to the complexity of operating in urban environments.[16] *Joint Urban Operations* points to the complexity and difficulty of operating in an urban environment as a prevailing consideration. This complexity will prevent or degrade traditional military maneuver. The U.S. military must identify an alternative concept to gain maneuver room and achieve operational objectives in this complex environment.

Control or Influence?

Just as Corbett and Mahan failed to agree, literature fails to concur on whether a megacity can be controlled (Mahan) or merely influenced (Corbett). As discussed earlier, *Joint Urban Operations* states that control of an urban area is a fundamental element to success in an urban operation.[17] Steven Metz, director of research at the Strategic Studies Institute, wrote a series of articles that suggest control should not be

[14] Barry M. Gough, "Maritime Strategy: The Legacies of Mahan and Corbett as Philosophers of Sea Power," *RUSI Journal* 133, no. 4 (1988): 55–62, https://doi.org/10.1080/03071848808445330.
[15] *Megacities and the United States Army,* 10.
[16] David Kilcullen, *Out of the Mountains: The Coming Age of the Urban Guerrilla* (New York: Oxford University Press, 2013).
[17] *Joint Urban Operations*, I-10–I-12.

the focus—but rather influence—to obtain the strategic objectives. He hypothesizes two scenarios: short-term disaster relief, and reinforcing the inherent resiliencies and systems of the megacity.[18] The key component of his argument is that the U.S. military is not designed, or capable, of controlling the megacity without a large-scale draft to dramatically change the size of the military. Kilcullen reinforces the weakness of current task organizations with a contrasting, biological perspective in which he views conflicts in megacities as malignancies. He identifies the need for a force that is capable of a limited footprint that can contain or remove the source of instability without causing too much damage to the city itself.[19]

Operational Design

Both military and U.S. government doctrine identify a gap in operational design. As previously discussed, planners must comprehend the environment, the problem, and the desired end state. Army general Gary E. Luck stated in *Joint Operations* that "to a greater degree than ever, diplomatic, informational, and economic factors, as well as the military, (our elements of national power) affect and contribute to national security in this complex environment."[20] The Department of State places similar importance on interorganizational coordination in both their Bureau of Conflict and Stabilization Operations and Foreign Emergency Support Team doctrines. Unfortunately, while the military and other departments of the U.S. government agree that understanding the operating environment and interorganizational coordination are critical elements to success in the future, current doctrine and task organizations do not support achieving either element.

Implications and Conclusions

The U.S. military, in support of a whole-of-government approach, must reassess current doctrine with regard to gaining maneuver space in a megacity. Assuming that control is not possible to achieve a military

[18] Metz, "Strategic Horizons," 1-1.
[19] Kilcullen, *Out of the Mountains*.
[20] *Joint Operations*, 2.

end state in a megacity conflict, we must consider how the military contributes to achieving success.

The United States must develop an expeditionary force capable of identifying and influencing established and emerging networks within a megacity conflict to set the conditions for follow-on government action. The key characteristics of this force include:

- Expeditionary: capable of deploying on short notice
- Flexible and adaptable: task organized for conflict
- Interorganizational: capable of leveraging the full spectrum of assets to appropriately influence the environment

MANEUVERING IN A MEGACITY: COMPARATIVE ANALYSIS OF GROZNY AND MEDELLÍN

In 2013, all of the world's conflicts were categorized as intrastate conflicts.[21] Approximately 27 percent of these were termed internationalized intrastate conflicts, or intrastate conflicts with an international actor involved. After reviewing trends from the Department of Peace and Conflict Research's Uppsala Conflict Data Program of conflict types by year, we can assume that future megacity conflicts will be intrastate conflicts (either pure or internationalized).

The operational design process and resulting operational approach to solving an internal conflict—with or without external support—significantly affects the role of the military in the solution. The Russian action during the Battle of Grozny in 1994–95 and the Colombian government actions in Medellín in the late 1990s and early 2000s represent two different operational approaches to gaining maneuver space for the government to operate. The Russians applied military mass to systematically clear Grozny, the capital of the Chechen Republic, of the enemy threat, while the Colombians applied influence at decisive points to neutralize the enemy threat and reduce the sources of instability.

[21] Lotta Themnér and Peter Wallensteen, "Armed Conflict, 1946–2013," *Journal of Peace Research* 51, no. 4 (2014).

The goal of researching these two cases is to analyze two operational approaches to gaining maneuver space by government forces in an intrastate conflict that takes place, at least in part, in urban battlefields. The research focused on initially determining how the country viewed the current situation, the problem, and the end state. During problem framing, the theory of control versus influence was critical to the operational approach of the two different governments. The Russians cleared Grozny to control the urban terrain. In contrast, the Colombians used influence at decisive points to achieve success. Moreover, the role and task organization of the security forces were compared to determine their contribution to achieving the end state of the government. Finally, the naval theories of Mahan and Corbett were compared to the governments' strategies, applying mass against the enemy compared to influencing LOCs. Drawing lessons learned from these case studies provides U.S. military planners with two operational approaches to gain maneuverability in a megacity.

Background of the Grozny and Medellín Conflicts

Grozny is situated along a critical ground LOC from the Caspian Sea to Moscow that facilitates the movement of oil.[22] With a current estimated population of fewer than 300,000 people, it is by no means a megacity.[23] However, Grozny has been the location of more than 10 conflicts during the previous 100 years, and it is the origin of many U.S. military techniques, tactics, and procedures for conducting urban operations.[24] Following the collapse of the Soviet Union in 1991, Grozny became the capital of the Chechen separatist movement led by former Soviet military officer Dzhokhar Dudayev. The conflict between Moscow and Grozny escalated between 1991 and 1994 as the Chechen separatist movement consolidated political and social forc-

[22] *Oil and the War in Chechnya: Black Gold from the Caspian* (New York: McGraw-Hill Education, n.d.).

[23] "2010 All-Russian Population Census: Volume 1. Population and Population Distribution," Federal Service of State Statistics, accessed 22 January 2015.

[24] William G. Rosenau, "Every Room Is a New Battle: The Lessons of Modern Urban Warfare," *Studies in Conflict and Terrorism* 20, no. 4 (1997): 371–94, https://doi.org/10.1080/10576109708436047; and Timothy L. Thomas, "Grozny 2000: Urban Combat Lessons Learned," *Military Review* 80, no. 4 (July–August 2000): 50–58.

es toward independence.[25] During 1994, Moscow attempted multiple subversive operations to regain influence over Grozny. These operations all failed to achieve the Russian objectives. On New Year's Eve 1994, the conflict transitioned to a new phase—the Russian strategy matured to one of domination.[26] Despite the failed offensive, Russian forces consolidated and systematically cleared the city, sector by sector, with heavy application of artillery and air fires.[27]

Employing a total force of approximately 60,000 soldiers, the Russians suffered approximately 1,800 killed in action. Chechen total force estimates vary significantly from source to source but are estimated at 2,000–12,000, with a resulting undetermined number of casualties. Most striking are the civilian casualties—an estimated 35,000 civilians were killed during this four-month period.[28]

Medellín is the second largest city of Colombia. Located in the Aburra Valley, it is situated along a critical ground LOC for the Colombian government to the Caribbean Sea and the southern countries of North America. With a current population of approximately 2.5 million, Medellín cannot be defined as a megacity, but its history of conflict does resemble many current fragile and feral megacities.[29] During the 1980s, the Medellín cartel, under the leadership of Pablo Escobar, established a social order based on the use of violence. In 1991, Medellín earned the moniker "murder capital of the world" with 381 homicides per 100,000 people in the city.[30] While the violence and deterioration of the city is often attributed solely to the cartel, the problem was much more complicated. The power brokers of Medellín

[25] V. S. Drozdov, "Chechnya: Exit from the Labyrinth of Conflict," *Russian Social Science Review* 37, no. 6 (1996): 28–43, https://doi.org/10.2753/RSS1061-1428370628.
[26] Drozdov, "Chechnya," 28–43.
[27] Ib Faurby, "The Battle(s) of Grozny," *Baltic Defence Review*, no. 2 (1999): 75–87.
[28] Timothy L. Thomas, "The Caucasus Conflict and Russian Security: The Russian Armed Forces Confront Chechnya III. The Battle for Grozny, 1–26 January 1995," *Journal of Slavic Military Studies* 10, no. 1 (1997): 50–108, https://doi.org/10.1080/13518049708430276. These civilian deaths occurred in spite of a Russian directive for civilians to depart the city prior to the cleaning operations. The mandate to leave was not enough to displace the population from the security of their homes.
[29] "Medellin Population, 2018," World Population Review, accessed 20 October 2017.
[30] Kate Maclean, *The 'Medellín Miracle': The Politics of Crisis, Elites and Coalitions* (London: Developmental Leadership Program, 2014), 5.

in 1991 included the Medellín cartel, the economic elite (coffee and mining), the FARC (Fuerzas Armadas Revolucionarias de Colombia), multiple militias and paramilitary forces working for different groups, and the Colombian government.[31]

The state of Colombia recognized it could no longer provide for the safety and security of Medellín citizens. The death of Escobar in 1993, along with international recognition of its murder rates, catalyzed the Colombian government to implement social, political, and structural changes to the city.[32] These changes, in conjunction with military operations to neutralize nonstate actors, assisted the government to regain influence over the city's population. While the process took decades, the result was revolutionary. Medellín recently won the Citi Award for Innovative City of the Year, beating out Tel Aviv and New York.[33]

Similarities and Differences

Although oceans apart, striking similarities can be seen between the conflicts of Grozny and Medellín. Both conflicts represent intrastate conflicts and take place around a large urban population. Grozny represents an intrastate conflict.[34] Medellín represents an internationalized intrastate conflict with the United States as the primary external actor. In both conflicts, the problem centers on the inability of the formal government to provide for the people. Specifically, formal political forces lacked a monopoly over the legitimate use of force.[35] Further, the enemy of the state was a complex mix of actors. In Grozny, the separatist government of Dudayev was the face of the enemy, but on the ground it was a collection of different groups and organizations with competing agendas. In Medellín, Escobar and the cartel was the face,

[31] FARC, or Revolutionary Armed Forces of Colombia, formed as a Marxist guerrilla organization in 1964 as the military wing of the Colombian Communist Party. Maclean, *The 'Medellín Miracle.'*

[32] Maclean, *The 'Medellín Miracle.'*

[33] "Colombia's Medellin Named 'Most Innovative City," BBC News, 1 March 2013.

[34] Some Russians dispute this and suggest that external Islamic extremist actors supported the Chechen rebels; however, evidence does not suggest this was decisive or even influential during the 1994–95 conflict.

[35] Drozdov, "Chechnya," 28–43.

but in reality there were multiple organizations and groups competing for power and influence. In both cities, however, the enemy competed for legitimacy and influence.

Both operations saw successes and failures. In Grozny, the Russian failure appeared more evident as they were displaced from the city in 1996. However, the Russians once again seized and destroyed the city in 1999–2000, maintaining relative control of it since then. In Colombia, the displacement of the Medellín cartel allowed the Cali cartel to consolidate power and influence throughout the country. Despite U.S. involvement to reduce drug trafficking into America, research suggests no noticeable metrics of success in this objective.[36] Finally, FARC remains an active organization in Colombia that continues to garner attention from the government.

While the similarities are important, the differences must also be acknowledged. The biggest difference can be seen in the history of conflict between the enemy and the state. In Grozny, the Chechen separatist movement originated in the Caucasian War from 1817 to 1864, during which Russia conquered and annexed the Caucasus. Cases of mass displacement, mass murder, and general mistreatment of Chechen nationals are also associated with this period and subsequent conflicts. The Colombian conflict with the enemy in Medellín can only be traced back to the 1950s when migration and economic policies laid the foundation for discontent against the Colombian government.

Operational Design: Control versus Influence

As previously discussed, the design process should answer three key questions: Where are we? (current situation); What is the problem?; and Where do we want to go?[37] In Grozny, the Russian perspective on the current situation was influenced significantly by the long history of conflict with the Chechens and the recent collapse of the Soviet Union. The Russian state lacked legitimacy as a governing institution

[36] Oeindrila Dube and Suresh Naidu, *Bases, Bullets and Ballots: The Effect of U.S. Military Aid on Political Conflict in Colombia* (Cambridge, MA: National Bureau of Economic Research, 2014).
[37] *Joint Operation Planning*.

and had not monopolized the use of violence. When they backed the failed pro-Russian opposition in the fall of 1994, the Russian government was embarrassed in the international arena.[38] As a result, Russian president Boris Yeltsin viewed the problem with a narrower perspective. The problem was not that the Russian state failed to provide a legitimate, functioning government to the Chechens; in this instance, the problem was simply the existence of the Chechen separatists. The separatists were largely based in Grozny; therefore, it follows that Russia must clear Grozny and destroy the Chechen separatist movement. The Russian operational approach focused on complete control of the city, which would enable destruction of the Chechen separatists, or an enemy centric approach.[39]

In Medellín, the Colombian government was more introspective in their approach. While Escobar and the cartel were the representatives of violence, members of the Colombian government and the city believed that the problem was more complex than the face of one man. Additionally, the consensus believed that change was needed in Medellín—being world-renowned for murder was not acceptable. The government realized that the problem was a complex web of socioeconomic (inequality), governmental (security architecture, representation), and structural (physical access and opportunities) issues.[40] While it did not have a clear end state, Colombia knew that it could not continue along its current course. The operational approach focused on influence rather than control. It employed a course of action to influence all of the identified problems in a comprehensive way, often anticipating the second- and third-order effects before deciding on a course of action.

Role of the Military: Main Effort versus Supporting Effort during Phases of the Operation

The U.S. military uses a six-phase model for planning operations: phase 0 (shape), phase 1 (deter), phase 2 (seize initiative), phase 3 (dominate), phase 4 (stabilize), and phase 5 (enable civil authority) (see

[38] Faurby, "The Battle(s) of Grozny," 75–87.
[39] Thomas, "The Caucasus Conflict and Russian Security."
[40] Maclean, *The 'Medellín Miracle.'*

figure 1.2).[41] Typically, the military will be the main effort in a whole-of-government approach for phases 1–4 and assume a supporting role in phase 0 and phase 5. This model is applicable to Russian operations in Grozny. During phases 0 and 1, the main effort came from Russian diplomatic engagement with the Chechen separatists. From November 1991, when Dudayev declared Chechnya independent, to the New Year's Eve offensive in 1994, the Russian military played a supporting role.[42] Their tasks included occupying Grozny as a deterrent, under the guise of a so-called peacekeeping force, and isolating Chechnya in support of an economic siege. However, these actions by the Russians culminated in the direct support of pro-Russian armed rebels in the fall of 1994 by Chechens. Russian diplomatic efforts failed and resulted in the military assuming the main effort in the winter of 1994. Phase 2 (seize initiative) started with the attack on New Year's Eve 1994, and phase 3 (dominate) lasted approximately three months. Unfortunately for the Russians, seizing Grozny never enabled the government to transition to phases 4 or 5—neither domination nor control of the city defeated the Chechen opposition. This chapter of the Grozny conflict ended with the Russians expelled from the city in 1996.

In Medellín, the military served as a supporting effort throughout the entire operation, while diplomacy represented the main effort. The Colombian government viewed the problem holistically. Security was a primary concern, but the government recognized that the military could not solve all the problems. The military (including U.S. military and intelligence) played a vital role in disrupting the organizations that had assumed influence within Medellín, most visibly by killing Escobar in fall 1993.[43] Applying the phasing framework to the operation would classify the period from 1991 to 1993 as phase 0 (shaping). Phases 2–5 overlap, with no significant delineation from phase to phase. What is notable, however, is a steady progress toward reestablishing formal government legitimacy by reconciling social, political, and structural issues.

[41] *Joint Operation Planning*, xxiii–xxiv.
[42] Drozdov, "Chechnya," 28–43.
[43] Maclean, *The 'Medellín Miracle.'*

Task Organization: Military Centric to Whole of Government

In Grozny, once the problem was determined to be enemy-centric, the Russian government employed a military-centric task organization to solve the problem. During the 1994 New Year's Eve invasion of the city, the Russian force consisted of three army groups—Northern Group, Western Group, and Eastern Group—each with distinct objectives in Grozny. These three groups advanced in columns on the city with a combination of reconnaissance and airborne troops in the lead, followed by a mix of armored, mechanized, and dismounted troops in trace.[44] The Chechen leadership allowed these large formations to enter the city, which enabled individual small units to attack isolated Russian units. The result was devastating for the Russians; for example, the Russian 131st Brigade lost 20 of its 26 tanks, and 102 of its 120 armored personnel carriers.[45] The New Year's Eve failure caused the Russians to withdraw and reevaluate their tactics. During the next three months, Russian artillery and air power enabled maneuver of ground forces to systematically clear each section of the city. Fires applied with little discretion allowed maneuver elements to clear the enemy block by block with little to no resistance. While eventually successful, the operation left the city destroyed. The techniques, tactics, and procedures developed during this battle continue to serve as doctrine for the U.S. military to clear urban areas.

Medellín never bore witness to large-scale military operations. Two task-organized security forces are worthy of analysis: the U.S. task force and the Colombian militia. U.S. military operations in Colombia were intelligence driven and executed in the context of the antidrug initiative of the 1980s and 1990s (also known as the War on Drugs).[46] Notably, the Colombian and U.S. governments restricted American participation to the limited objective of disrupting illegal drug operations, which relegated the military to a supporting effort. The U.S. task force represented an interorganizational force that successfully inte-

[44] Faurby, "The Battle(s) of Grozny," 75–87.
[45] Faurby, "The Battle(s) of Grozny."
[46] Dube and Naidu, *Bases, Bullets and Ballots*.

grated the military, the Drug Enforcement Agency, the Department of State, and other intelligence organizations to achieve unified action. While turf wars sprang up between the different organizations, their synchronized efforts enabled the Colombian government to gain maneuver room in Medellín.

The Colombian militia emerged in 1991 as a transitional security force in Medellín. Recognizing that security was an essential service the Colombian government could not provide, the city of Medellín (with Colombian government approval) entered into peace talks with local militias. These groups were one of the many power brokers already providing local security. The peace talks, however, legitimatized their role in providing security for the populace. It is important to note that there was a historical precedence for nontraditional security forces. Legislation dating back to the 1960s legalized civilians' ability to take up arms in their own defense. In 1994, paramilitarism was legalized and provided legitimate private security forces to neighborhoods, businesses, and families.[47] While these groups were later dismantled in 1997 after being declared unconstitutional and criticized by international human rights groups, they provided an effective, local solution to the security problem. They temporarily secured a line of communication to enable subsequent government maneuver.

Mahan versus Corbett: How Was Maneuver Space Generated?

Historically, mass has been a critical planning element for Soviet and Russian military doctrine. Analysis of the Soviet development of operational art, or the "Deep Battle" concept, reveals the importance of mass at the decisive point to obtain victory.[48] At the tactical level, the principle of mass was applied to the battle of Grozny in 1994–95. While the initial attack force on New Year's Eve was approximately 30,000 soldiers, the Russians employed close to 60,000 total military personnel against an enemy force no larger than 12,000.[49] This approach

[47] Maclean, *The 'Medellín Miracle.'*
[48] Jacob W. Kipp, *Mass, Mobility, and the Red Army's Road to Operational Art, 1918–1936* (Fort Leavenworth, KS: Soviet Army Studies Office, Combined Arms Center, 1988).
[49] Faurby, "The Battle(s) of Grozny."

was similar to Mahan's theory of victory at sea—mass and attack the enemy force.[50] The Russians determined that control of the network could only be achieved by destroying the enemy. At the tactical level, the Russians maneuvered with the application of combined arms. During the systematic clearance of Grozny, the application of artillery and air power generated an advantage for the Russian mechanized and armored forces. They exploited that advantage and cleared the city sector by sector. Maneuver was limited to this spatial perspective.

In Medellín, the Colombian government focused on disrupting and influencing critical lines of communication (networks) throughout the city. These LOCs included mending the social inequality between the elite and the city's poor, restructuring the political and security system, and enabling physical access and opportunities for social advancement within the city. This approach represents an approach similar to Corbett's theory of victory—disrupting and influencing specific LOCs to enable maneuver.[51] Maneuver for the Colombian government was obtained by generating and exploiting advantages simultaneously and along multiple lines of operation—economic, political, and social—for a systemic effect.

Findings

Different approaches to operational design led to extremely different operational approaches for the 1994–95 Battle of Grozny and the Medellín conflict. In Grozny, the Russian government viewed the enemy as the singular problem. With this assumption, the destruction of the enemy became the sole objective of the Russian government. For Medellín, Pablo Escobar appeared to be the source of the problem. Introspective analysis by the Colombian government, however, revealed several social, political, and structural issues, whereby a holistic view led to a holistic operational approach.

Interorganizational coordination supported unity of action. While the Russian military as the main effort was effective during the deci-

[50] Gough, "Maritime Strategy."
[51] Gough, "Maritime Strategy."

sive phase of Grozny and cleared the city of Chechen separatists, the second- and third-order political and social effects were tremendous. The Russian government's failure to transition to civil authority resulted in the Russians losing the city again in 1996, though only to seize it again in 1999–2000 and hold it continually since. The supporting role of the military in the interorganizational effort by the Colombian government in Medellín, where the state took the lead with multiple contributing agencies both internal and external to Colombia, was effective in achieving unity of effort and the desired end state.

This research identifies two different operational approaches to enable maneuver within a megacity: mass to gain numerical superiority and gaining relative superiority through securing critical LOCs. The Russians gained physical maneuver space through the massing of combined arms combined with tactical movement of ground forces. The Colombian government did not apply mass, but it gained relative superiority through the execution of a holistic operational approach that secured critical LOCs throughout the city.

Conclusion of Comparative Analysis of Grozny and Medellín

Maneuver in a megacity is obtainable. The U.S. military is capable of massing and systematically clearing a city as the Russians did in Grozny. Should the U.S. military do the same in a megacity conflict? Current social and political restraints would never allow the wholesale destruction of a city. Therefore, to succeed in a megacity conflict, the American military concept of maneuver must expand from a spatial one focused on creating and exploiting an advantage on the enemy in the physical domain to creating and exploiting advantages that will holistically move the situation toward the desired end state. Established and emerging networks must be disrupted and influenced; in this instance, an attempt to control will only lead to the destruction of those networks. Positive resiliencies of the megacity can be reinforced to gain and exploit an advantage, while negative influences should be disrupted until the resiliencies of the city can destroy them. Further research will focus on how the U.S. military can best be em-

ployed to gain relative superiority for its efforts in a megacity conflict and gain critical maneuver space for the commander. Research will focus on techniques to integrate the U.S. military in an interorganizational effort.

OPERATIONAL CONCEPT: DISTRIBUTED INFLUENCE

Purpose of the Concept

This concept proposes an operational approach to gain maneuver space for military forces in a megacity. Maneuvering in a megacity will be challenging. The interconnectedness and complexity of a megacity demands an operational approach that respects these factors. Population density, urban terrain, and connectedness will exponentially increase the complexity of the environment. To overcome this issue, a systems approach to understanding the environment and defining the desired state might offer a solution. Once this is achieved, multidomain combined arms is applied across a distributed battlefield to influence the megacity toward the desired state. Before proceeding, several key terms must be defined.

Key Terms and Definitions

- **Maneuver warfare**: identifying or creating an advantage and the subsequent exploitation of the advantage to advance toward a desired state.
- **Maneuver space**: the freedom to advance (physically and/or cognitively) toward a desired state.
- **Multidomain combined arms**: the application of traditional fires (e.g., aviation, artillery) combined with information operations (synchronize all information-related capabilities to influence, disrupt, corrupt, or usurp the decision making of a target) across all five operational domains (sea, land, air, space, and information).[52]
- **Nodes**: a connection point or the intersection of different

[52] *Information Operations*, JP 3-13 (Washington, DC: Joint Chiefs of Staff, 2014).

connections (e.g., a place, a person, a group, an idea) either physically or conceptually.
- **Connectors**: the element that establishes a relationship between two or more nodes.
- **Network**: the structure of different nodes and connectors that make up a model.
- **Influence**: the capacity to have an effect on the system.

Time Horizon, Assumptions, and Risks

In 2012, the *Capstone Concept for Joint Operations* describes the future security environment as "more unpredictable, complex, and potentially dangerous than today."[53] Additionally, it suggests that a general reduction in defense accounts will lead to a smaller military force. An increasingly complex operating environment, coupled with a shrinking military, requires a shift in operational approaches. Fortunately, this concept does not require any additional materiel or structure for the military. While developments in technology and force structure will enhance its effectiveness, they are not required. This operational concept is viable now, and it is flexible enough to be applied in a major theater of war to humanitarian assistance and disaster-relief scenarios in large urban environments.

Constructing this operating concept is grounded in four assumptions. First, destruction of the city is not desirable, particularly as employment of this option inevitably results in a difficult, if not impossible recovery of the city. Second, this concept assumes the United States is most likely engaging in an internationalized intrastate conflict in a megacity. While this concept is optimized for this scenario, it remains relevant to other scenarios. Third, this concept assumes that traditional "mass" is not achievable due to the size and density of a megacity. As discussed in the case study on Grozny, the Russians required a force of nearly 60,000 soldiers to secure Grozny, a city of less than 1 million people. As U.S. military spending changes over time, so

[53] *Capstone Concept for Joint Operations*, 3.

too does its force.[54] Using Russian forces as a basis, a minimum force of 1.2 million would be required for a megacity. Based on this projection and recent history of U.S. force commitments to conflicts, the government cannot commit this large of a force to a megacity conflict. Finally, this concept assumes that influence encompasses a positive and negative connotation. As defined above, the term simply refers to the capacity to have an effect on the system. For example, compare the two tactical tasks of reinforce and disrupt. Reinforce focuses on increasing capacity to sustain (positive), while disrupt focuses on denying the enemy the ability to employ their forces (negative). Although both tasks describe an influence to the system, one is positive and one is negative.

Applying this concept assumes two primary risks. The first is associated with any application of economy of force: the mass to destroy the enemy at the decisive moment will not be available. If the means to exploit maneuver space is not available, the conflict is needlessly prolonged. The second risk associated with maneuver warfare results from catastrophic failure. The Marine Corps' doctrinal publication *Warfighting* states that maneuver warfare "incompetently applied carries with it a greater chance for catastrophic failure. With attrition, potential losses tend to be proportionate to risks incurred."[55] Unintended effects can cause the system to irreversibly advance toward an undesirable state. However, the better the system is defined, the more likely a positive solution will develop.

Description of the Military Problem

Future conflicts will emerge in megacities that will require unified U.S. government action. Operations must influence established and emerging networks (physical and cognitive) to enable maneuver. An attempt to control will lead to the destruction of the network. Positive resiliencies of the megacity must be reinforced to create and exploit

[54] *Defense Budget Overview: United States Department of Defense Fiscal Year 2019 Budget Request* (Washington, DC: Department of Defense, 2018), 1-3.
[55] *Warfighting*, Marine Corps Doctrinal Publication 1-0 (Washington, DC: Headquarters Marine Corps, 1997), 38.

advantages, while negative resiliencies must be disrupted until the city can organically neutralize or destroy them. Defining the objective (desired state) and employing economy of force (as traditional mass cannot be achieved) will be critical principles to success. No current operating concept within the Department of Defense (DOD) maximizes the ability to gain maneuver space in a megacity conflict.

Synopsis of the Central Idea

The distributed influence operating concept proposes multiline and multidomain influence along critical nodes and connectors. This influence results in a systemic effect on the operating environment that enables maneuver. This concept synthesizes elements from maneuver warfare, distributed operations, and cognitive joint force entry. While many interpretations of maneuver warfare exist, the concept of creating and exploiting an advantage to achieve the desired state is central to distributed influence. These advantages are not limited to the physical and can include the cognitive.[56] The term *distributed operations* offers many definitions and interpretations.

Colonel Vincent J. Goulding from the Marine Corps Warfighting Lab wrote a series of papers and articles on distributed operations and its applicability to the Marine Corps. He envisioned operations with small, highly capable units spread across a large area of operations to create an advantage over an adversary through the deliberate use of separated and coordinated independent tactical actions. Simplified even further, distributed operations combines tenets of maneuver warfare with economy of force for systemic effect.[57] U.S. Army Special Operations Command proposed cognitive joint force entry as operating concept in a 2014 white paper, which describes how to apply influence and information activities to counter new challenges and the availability of scalable options for senior leadership to shape environments in the earliest stages. This is an apt description of applying

[56] *Warfighting*, 37–38.

[57] Vincent J. Goulding Jr., "Distributed Operations," *Marine Corps Gazette* 91, no. 2 (2007): 51–53.

influence in the cognitive realm of operations to achieve the desired state.[58]

Principles of Distributed Influence: Define, Identify, Influence, and Exploit

Define: a systems approach to understanding the problem and identifying the desired state. The megacity is a complex system comprised of different nodes interconnected through interactions with one another. These nodes include physical structures (skyscrapers, roadways), people (city mayor, trash collectors), and subsystems (transportation, economic, and security). These nodes are not limited to the physical world; they are also cognitive. Thoughts and ideas interact within the system and serve as both nodes and connectors (e.g., internet, social media, religion, etc.). Problems in a megacity exist within this interconnectedness, though these problems are not subject to a reductionist approach.

Networks are mental models of the nodes and connectors within a complex system. This architecture of complexity allows planners to understand how nodes are connected. Modeling these networks in a megacity demonstrates that the megacity is different than the sum of its parts.[59] Consequently, planners cannot isolate problems in an interactively complex system.[60] Additionally, the outcome of any operation is the product of multiple interactions with different nodes and is not predictable with a cause and effect approach.[61] To succeed in this environment, planners benefit from applying systemic operational design.

Systemic operational design is an approach intended to help planners understand the interconnectedness of nodes in a system and to develop an operational approach to achieve a desired state. In *A Systemic Concept for Operational Design*, John Schmitt describes

[58] *Cognitive Joint Force Entry* (Washington, DC: U.S. Army Special Operations Command, 2014).
[59] Robert Jervis, *System Effects: Complexity in Political and Social Life* (Princeton, NJ: Princeton University Press, 1997), 12.
[60] John F. Schmitt, *A Systemic Concept for Operational Design* (Montgomery, AL: Air University, 2006).
[61] Jervis, *System Effects*, 79.

how a systemic understanding of the situation will result in a course of action.[62] Embracing the interactive complexity of a situation enables simplicity. Zooming out and embracing the complexity allows one to focus on the nodes and connectors that matter most and to develop an effective operational approach.[63]

Identify: while defining the problem and modeling the system, specific nodes and connectors will emerge as susceptible to influence. Three key considerations are: susceptibility, impact, and sustainability. Once the problem and a desired state are defined, planners identify nodes and connectors dispersed throughout the megacity that are susceptible to influence and will enable maneuver. Some connectors and nodes are not susceptible to influence; for example, disrupting the drinking water supply to a megacity could be very influential, though deliberately targeting civilian infrastructure is prohibited by international law. Susceptibility is simply whether the specific node or connector can be influenced based on the planning limitations (constraints and restraints). Impact is defined as having disproportionate effects or, in this case, the ability to influence a single node or connector and yet have an effect across the whole system. Finally, sustainability relates to the temporary or long-term effect of the influence. Operations to influence occur once the nodes and connectors to influence are identified.

Influence: operations taken to positively and negatively affect the system to advance it toward a desired state. During the influence stage, operations must be focused to disrupt the negative and reinforce the positive aspects of the system. With this phase, the role of supported and supporting units must rapidly transition relationships to achieve maximum influence. The relationship between supported and supporting units and or activities is unlimited and based on the susceptibility and access to key nodes and connectors. For example, in many conflicts, commanders direct that everything must support the ground-based maneuver as the main effort. During distributed

[62] Schmitt, *A Systemic Concept for Operational Design*, 3.

[63] The language here is derived from ecologist Eric Berlow and physicist Sean Gourley during a TED Talk on mapping ideas. Eric Berlow and Sean Gourley, "Mapping Ideas Worth Spreading," TED Talks, February 2013, 7:52.

influence, the main effort can rapidly change and is often not the physical movement of ground forces. Information operations (IO) can support physical movement just as easily as physical movement supports IO; intelligence supports operations, just as operations support intelligence. Fires can support maneuver, just as maneuver can be employed to support fires. The transition between supported and supporting can rapidly change based on the opportunities identified or created. Flexibility and adaptability achieved through an understanding of the system (achieved in design) are critical in enabling this rapid transition from supported to supporting.

Exploit: taking advantage of the distributed influence and achieving quasi-homeostasis. This principle focuses on neutralizing the problem. While not destroying it (which is often impossible), exploitation renders the problem to a manageable state. If the focus is enemy-centric during an internationalized conflict, homeostasis is achieved when the host nation security forces are capable of maintaining dominance over the enemy, though also applicable to other sources of instability. In the end, once the isolation or neutralization of the problem is such that U.S. forces can be removed, the system will reach quasi-homeostasis as the desired state.

Application in Operational Phasing

- Phase 0 (shaping): the actions required to define the problem within the operational environment. By activating the system, we gain a better understanding of the problem and identify critical nodes and connectors susceptible to influence.
- Phases 1–2 (deter and seize the initiative): multiline, multidomain maneuver by semi-independent, task-organized cells to influence critical nodes and connectors across a distributed area to gain maneuver space (influence across the spectrum). Flexibility and adaptability to rapidly change tasks to exploit uncovered gaps. Physical dispersion and influence across the system prevents a coordinated enemy response. Methods to achieve this influence include:
  - Offensive operations
    - Raids

        - Limited penetration: penetration concept scaled down from the brigade and applied as the raid concept of a planned withdrawal
        - Military deception: coercion and confusion
    - Defensive operations
        - Secure and protect key infrastructure
        - Reinforce friendly positions
    - Stability operations
        - Foreign internal defense support to host nation security forces
- Phase 3 (dominate): exploit the advantage that has been created, which is ideally achieved with the host nation in a unified action (as a whole-of-government approach). The enemy is effectively neutralized to the point that the host nation maintains the equilibrium or quasi-homeostasis.
- Phases 4–5 (stabilize and enable civil authority): employment of semi-independent cells continues under the request of host nation government as required until the internationalized aspect of the conflict can be concluded.

The Theory of Victory Is Defined

If distributed influence is applied at critical nodes and connectors across the system, then the system can be advanced to a desired state. The desired state must be limited to achieving quasi-homeostasis, or establishing and maintaining an equilibrium that is acceptable to conclude internationalized support to an intrastate conflict.

Application and Integration of Military Functions

Distributed influence requires synchronized application across the joint warfighting functions to be effective, including command and control, intelligence, fires, movement and maneuver, protection, and sustainment. Command and control effectively prioritizes and synchronizes the application of intelligence, fires, and movement and maneuver as supported and supporting efforts. Moreover, movement and maneuver will not always be the main effort. Command and control must enable the rapid transition between supported and support-

ing units and allow for decentralized decision making by subordinate commanders, which is further enabled with a complete understanding of the system and the desired state.

Intelligence must be flexible and responsive enough to enable an understanding of influence on the system. The faster intelligence aggregates information and assesses the effects on a system, the quicker a commander can make decisions to exploit opportunities. Fires must be centralized enough to rapidly exploit targets and yet responsive enough to provide effective fire support for decentralized, dispersed units. Additionally, IO must be prioritized and planned for with the same detail as traditional fires. IO should not be considered a subset of fires. Movement and maneuver are synchronized with intelligence and fires to systemically influence the megacity toward a desired state.

Economy of force employment will create greater force protection concerns when conducting traditional relative combat power assessments, which are further mitigated through the multidomain influence on the system and the dispersed nature of maneuver elements. Sustainment remains one of the greatest challenges in distributed operations. Planning must enable the greatest adaptability of maneuver cells to prevent reliance on a traditional push/pull sustainment plan. Sustainment can include foraging and host nation acquisition. However, the second- and third-order effects of these techniques must be assessed when considering how these actions will positively or negatively affect the system.

Necessary Capabilities

As previously discussed, there are no critical shortfalls when applying this operating concept in a current conflict. However, advances in technology will have significant impacts on the effectiveness of this concept.

CONCLUSION

While the military and the U.S. government may not desire to enter a conflict in a megacity, circumstances may require it. Current military doctrine for fighting in an urban environment, however, is not sufficient

for operations in a megacity. For example, the principles of control and isolation, central to current doctrine, are not realistic to operations in a megacity. If control and isolation are not obtainable to support maneuver, an alternative concept must identify how a commander can achieve the objective.

Distributed influence proposes an additional operational approach to gain maneuver space for military forces in a megacity, which exploits the interconnectedness and complexity of a megacity. This operational approach also takes into consideration the assumption that traditional mass will not be achievable by the military force. Through a systems approach to understanding the environment and defining the desired state, influence (both positive and negative) can be applied to create systemic effects and to achieve the desired state. While control and isolation are not possible, influence is achievable. Advances in technology and other capabilities will enhance the ability of the U.S. military to apply distributed influence in future conflicts, but they are not required to be successful in a current operation.[64] Operational testing of this concept is recommended to evaluate the applicability in future megacity conflicts.

[64] Of note, the U.S. Army released *The U.S. Army Operating Concept: Win in a Complex World, 2020–2040* (Washington, DC: Department of the Army, 2014). This operating concept identifies and outlines changes to doctrine, manpower, and equipment that will enhance the Army's ability to apply the concept of distributed influence.

CHAPTER SIX

Coordinating Chaos

Integrating Capabilities in Future Urban Conflict

Major Robert D. Barbaree III, U.S. Marine Corps

Is it possible for a global power to be operationally and tactically superb but strategically inept? To answer that question in the context of militarized megacities and terrorist groups, we must first agree that a new definition of victory is necessary, even as we realize that victory is simply a matter of perspective. With reflection, would the populations of Mosul, Iraq, and ar-Raqqah, Syria, consider themselves the center of a victorious situation? They have suffered massive destruction and decimation, yet are considered liberated from a nonstate terrorist regime.

INTRODUCTION

Recent events in Mosul and ar-Raqqah have ignited a resurgence in the U.S. military's critical analysis of urban warfare. The idea of destroying a city to save it is not desirable when considering options for operations in dense urban terrain (DUT). As strategists refine the theory of victory, the United States will require refined operating concepts as well.[1] Rather than the destruction and total annihilation of enemy forces, the U.S. military looks for ways to surgically remove vi-

[1] Benjamin M. Jensen, *Forging the Sword: Doctrinal Change in the U.S. Army* (Stanford, CA: Stanford Security Studies, an imprint of Stanford University Press, 2016), 16–17.

olent actors from otherwise benign areas. A less destructive solution facilitates transferring control to civil authorities without significant reconstruction of critical infrastructure. However, to address urban warfare from a purely military perspective is a mistake; the breadth of problems that American forces will encounter in future urban systems will quickly transcend conventional military capabilities. As a result, planners must properly analyze the system they rely on and include all interorganizational capabilities in a proactive review of strategic and operational concepts for conflict in major cities.[2] Close relationships are paramount to influencing operational outcomes by leveraging the organization that has the appropriate environmental knowledge, authorities, and access. Cross-talk between civil agencies and military commands must occur at every level by incorporating competent liaison officers (LNOs) and coordination cells to grow operational art beyond military considerations.

CITY AS A SYSTEM

Understanding a city as a system and how it responds to inputs is an important step to developing future techniques for combat in this environment. Ultimately, cities are complex systems that are as unpredictable as war itself. Although cities can be relatively predictable environments during normal operations, once a city's normal operations are disrupted by war or conflict, predictability all but disappears. In her literature review of urban metabolism, Elizabeth Rapoport recognizes that recent urban studies frequently apply "complex systems theory, which conceives of systems as open, non-linear, hierarchically organized entities consisting of a number of agents interacting amongst themselves and with their environment."[3] This description aptly represents what we encounter in an urban environment. Open systems fluidly exchange feedback with their external environment, have porous boundaries, and exhibit equifinality, or more than one

[2] David N. Farrell and Megan Ward, *Megacities and Dense Urban Areas Initiative: Data Collection and Analysis* (Hampton, VA: U.S. Army TRADOC [G-2] Mad Scientist, Mitre, 2016).

[3] Elizabeth Rapoport, *Interdisciplinary Perspectives on Urban Metabolism: A Review of the Literature* (London: Development Planning Unit, University College London, 2011), 9.

way to achieve the same or similar results.[4] Next, nonlinear systems are "those that disobey proportionality or additivity" and become unpredictable as a result.[5]

The idea of proportionality supposes that an input to a system will result in a proportional output. As a linear concept, proportionality provides a direct connection between input and output that does not exist in a complex system. Additivity reduces a system into smaller components with the idea that solving component problems will eventually add to solving the entire problem.[6] Warfare in urban environments certainly disobeys both of these principles. Finally, hierarchical organization has multiple applications but, in this case, urban hierarchy refers to three levels: inhabitants, the city, and how the city integrates into the overall system of cities in a region.[7] Interaction at each of these levels will produce different results that may or may not support overall operational objectives. The characteristics of an open, nonlinear, and hierarchical organization allow planners to understand how to interact with the city, and how to anticipate potential consequences of various inputs.

Robert Jervis explains in his study of interactions that "we are dealing with a system when (a) a set of units or elements is interconnected so that changes in some elements or their relations produce changes in other parts of the system and (b) the entire system exhibits properties and behaviors that are different from those of the parts."[8] Jervis also discusses the cyclic nature of the interaction of an actor and its environment. An actor does not just change the system or the environment by making inputs. As the system frequently adapts, the change in the environment and feedback to the actor subsequently

[4] Albert J. Mills et al., eds., *Encyclopedia of Case Study Research* (Thousand Oaks, CA: Sage, 2010), https://doi.org/10.4135/9781412957397.n126.
[5] Alan Beyerchen, "Clausewitz, Nonlinearity, and the Unpredictability of War," *International Security* 17, no. 3 (Winter 1992): 62.
[6] Beyerchen, "Clausewitz, Nonlinearity, and the Unpredictability of War."
[7] Denise Pumain, ed., *Hierarchy in Natural and Social Sciences*, Methodos Series 3 (Dordrecht, Netherlands: Springer, 2006), 3–4.
[8] Robert Jervis, *Systems Effects: Complexity in Political and Social Life* (Princeton, NJ: Princeton University Press, 1997), 235.

change the actor itself.[9] This idea is relatively intuitive for the Marine Corps to apply since it ties directly to the single-battle concept as defined in the *Marine Corps Planning Process*: "Operations or events in one part of the battlespace often have profound and consequent effects on other areas and events; therefore, a commander must always view the battlespace as an indivisible entity."[10] In recognizing a city as a system, Karl Marx's urban metabolism idea has resurfaced in the last 50 years to understand how it actually functions. Marx supposes that cities, just like an ecosystem or a human body, consume inputs and create waste concurrent with the activity of the entire system.[11] If the city is unable to metabolize all of the inputs, it can quickly become overwhelmed and increased toxicity in the system will result in a destabilized environment. A significant analysis of the way an urban system metabolizes inputs from its environment is imperative for future combat operations in these environments to be successful.

When considering this complex environment, studies in scientific revolutions and systems theory consider similar properties that the United States will encounter in addressing the future of warfare, especially in urban environments. In *The Structure of Scientific Revolutions*, Thomas S. Kuhn highlights the difference between "normal" and "revolutionary" phases of science. A normal phase occurs when the scientific research adheres to a status quo and largely follows the paradigmatic model with few anomalies. A revolutionary phase emerges when the anomalies or outliers increase, and the existing paradigm can no longer solve problems, forcing scientists to develop a new model. In the struggle to find solutions, the revolutionary model does not necessarily maintain all of the tenets of the previous paradigm but must maintain an equal or greater problem-solving power to be relevant.[12] Also, especially when considering military doctrine,

[9] Jervis, *Systems Effects*, 125–75.
[10] *Marine Corps Planning Process*, MCWP 5-10 (Washington, DC: Headquarters Marine Corps, 2016), 1–6.
[11] David Kilcullen, *Out of the Mountains: The Coming Age of the Urban Guerrilla* (New York: Oxford University Press, 2013), 41–45; and Rapoport, *Interdisciplinary Perspectives on Urban Metabolism*, 6–8.
[12] Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 2012), 62–65, 144–58, 169.

development trends toward punctuated equilibrium of long periods of consistency, which are marked by short periods of dynamic change.[13] In response to a revolutionary period driven by increased urbanization, progress in urban operational art will require understanding the nature of the system in which we operate. War is a nonlinear, or complex, system that is unpredictable because repeated actions infrequently lead to repeated results as human psychology and conflicting problem-solving cycles compete. This discussion of scientific theories assists the development of future operational art, particularly when considering the urban environment, and will allow the United States to proactively impose a revolutionary approach to operations in DUT before the normal period is punctuated by our adversaries and we are forced to react in a complex system.

MODERN CASES

Events of 11 September 2001, Operation Enduring Freedom (OEF), and Operation Iraqi Freedom (OIF) marked an end to equilibrium in a normal period of military science. The world was catapulted into a punctuated and revolutionary period as global terrorism and warfare in Iraq and Afghanistan forced militaries to address new and different adversaries. Not only were the enemies diverse in capability but also in the environment that they occupied. The U.S. military's old paradigm—designed based on Cold War assumptions and success in Operation Desert Storm—could no longer address the anomalies associated with a new global threat. This was particularly true with regard to counterinsurgency and urban operations. The U.S. military had seemingly forgotten the lessons of the Vietnam War and revisited the past in the search for similarities to develop capabilities and doctrine to meet this new threat. With regard to urban operations, fighting in Fallujah, Sadr City, and Mosul, Iraq, during OIF provided a laboratory for experimentation with novel solutions to the new realities of urban warfare. Concluding OIF, it would appear that the United States reverted back to a normal period of equilibrium. But urbanization is growing

[13] Stephen Jay Gould, *Punctuated Equilibrium* (Cambridge, MA: Belknap Press, an imprint of Harvard University Press, 2007), 39–40, 295.

rapidly and future operations in DUT will present new challenges for the U.S. military.

In April 2004, four American Blackwater contractors in Fallujah, Iraq, were killed and hung from a bridge crossing the Euphrates River, after which Combined Joint Task Force-7 (CJTF-7) ordered I Marine Expeditionary Force (I MEF) to attack the city. Despite initial protests, I MEF initiated Operation Vigilant Resolve (First Battle of Fallujah).[14] The operation was quickly organized around only two Marine Corps infantry battalions, with two more joining the fight later. Marine commanders were not clear about what their objectives were, facing stiff resistance from embedded insurgents in the city, and the initial fight lasted five days during 4–9 April. As the insurgency exploited negative press that impacted the United States and the government of Iraq, operations were ended on 1 May before the Coalition could realize tangible results. Unfortunately, Vigilant Resolve did attract additional insurgent fighters and illicit activity to the area. As enemy activity increased, CJTF-7 leadership attempted to form an ISF Fallujah Brigade to keep order while U.S. forces remained on the outskirts of the city in support. As the Fallujah brigade disintegrated and many defected to the insurgency, it became increasingly clear that American forces would have to reenter the city and gain control. The Islamic insurgents were brutal in their control of the city and executed several Western hostages in highly publicized murders. The Coalition response was a much more deliberate planning effort for Operation Phantom Fury (Second Battle of Fallujah).[15]

I MEF learned from Vigilant Resolve and took significant steps to ensure that conditions were set for Phantom Fury to succeed. As planning began, so did information operations (IO) to influence the civilian population of Fallujah to leave the city. As a recurring theme in urban combat, the threat of civilian casualties informed by the recent experience of Vigilant Resolve made the Coalition wary of reentering Fallujah with a significant civilian presence at risk. In conjunction with limited raids and coordinated air strikes, U.S. forces used the IO cam-

[14] Gian P. Gentile, "Listen to the Airman," *Military Review* 88, no. 2 (2008): 69.
[15] Gentile, "Listen to the Airman," 69–71.

paign to encourage civilians to depart. On the eve of the battle, few civilians remained, and the Coalition had a good understanding of the enemy disposition in the city.[16] This time, the clearing force would include four Marine infantry battalions, an Army armored brigade, and nine Iraqi battalions for a coordinated, mutually supporting clearance operation from north to south, while supporting elements blocked the south and east. The overall concept was to coordinate the employment of armor and infantry; in this instance, armored Army units would rapidly push through the city to secure key objectives, while Marine light infantry would clear the city in detail.[17] It would be hard fighting, but overwhelming mass would ensure no sanctuary for the enemy.

On 7 November 2004, Coalition forces secured the initial objectives of Phantom Fury and set the stage for the main assault to begin the next day. Difficulty breaching the berm north of Fallujah, and fierce resistance in the city, made progress slow for the Marine light infantry units, but they aggressively progressed nonetheless. The armored forces, however, were able to rapidly advance and seize their objectives. As events stabilized in the northern half of the city, Coalition forces continued south to insurgent defensive positions that were much more developed due to the belief that the Coalition attack would come from the south. By 12 November, all Coalition forces had reached their objectives, however, not all were secured. In the process, they discovered house-borne IEDs, a significant tunnel network, and heavily fortified positions that showed the enemy's preparedness.

The continued clearance of all of the city blocks represented a significant challenge due to the enemy's resolve to stand and fight, their support from foreign fighter networks, and drug use to boost courage and endurance. It was clear that the insurgents were determined to fight and take as many American lives as possible. Therefore, clearing the city house by house and room by room became a particularly difficult option. The success of the IO campaign in removing the vast majority of civilians offered Coalition forces another option. Rather than go into a heavily fortified house and suffer ca-

[16] Gentile, "Listen to the Airman," 72.
[17] Gentile, "Listen to the Airman," 75.

sualties, Coalition forces could now confirm enemy locations, back away, and then use fire support to catastrophically destroy the building—a return to the idea of destroying a city to save it. Coalition forces still had to clear every building, but this adapted tactic made the effort much safer by killing most of the remaining fighters or scaring them off of the battlefield.

By mid-November, Coalition forces had transitioned to reconstruction, while fighting continued throughout the city.[18] Clearly, a shift in mind-set had occurred on how best to conduct operations in this type of urban environment. With the relatively small size of the city, it seemed realistic to run a campaign to get civilians to leave before the battle. As the fight progressed during three days, the shift to using "firepower, and not primarily muscle power to clear buildings of enemy fighters" became ever more pervasive.[19] The excessive casualties experienced by Coalition forces, especially Marines, while clearing buildings was unacceptable relative to the mission gain. Not only did Marines rely on fire support from artillery and aviation, but they quickly adapted to coordinate closer with their armor counterparts to have direct fire support available at a moment's notice. This infantry-armor coordination was critical to ensure the safety of both. If an attack was led by armor, it typically reduced the enemy threat before exposing light infantry. If the infantry initiated the next attack, insurgents were lured into complacency or overaggression due to the distant sound of armor. In this situation, they would expose themselves to get a shot at the tanks, but light infantry would already be in a position to attack. This mutual support, coupled with the overwhelming use of supporting fires, directly reduced the human toll required to clear the rest of Fallujah. Even though armor was not always available to the Marines, and many still had to fight house by house with only light infantry, the adaptation to closely integrate armor and overwhelming fire-

[18] Gentile, "Listen to the Airman," 76–83.
[19] Gentile, "Listen to the Airman," 93.

power to destroy versus clear buildings is a hallmark of Fallujah II.[20]

In 2008, the battle for Sadr City reaffirmed the nonlinearity of urban combat and highlighted the ingenuity required to reduce an adversary in this environment. Sadr City is on the northeast edge of the Baghdad urban sprawl and had an estimated population of 2.4 million at the time of the battle.[21] For comparison, Manhattan, which is twice the geographic size of Sadr City, had a population of 1.6 million in 2010.[22] The population density and total control that the Coalition's adversary, Muqtada al-Sadr and Jaysh al-Mahdi (JAM), had on the population presented a significant challenge to Coalition forces. However, their understanding of JAM's character and the purpose of the operation were critical in identifying the best method to achieve the desired end state. JAM forces had been harassing the international zone of Baghdad with rocket fire and preceded major Coalition operations in al-Basrah, Iraq, with another significant rocket attack and disruption operations throughout Baghdad. Events in Sadr City threatened the success of the impending al-Basrah mission, so U.S. forces were tasked to stop JAM activity and return control of the city to the government of Iraq.[23] Because of the size and density of the city, Coalition forces required an approach that did not involve clearing it in detail.

To address the threat posed by JAM, Army major general Jeffrey W. Hammond chose an operational approach to "isolate Sadr City, influence its population, then employ Iraqi security forces (ISF) to stabilize the district."[24] Isolation seemed the only viable option since U.S. forces did not have the numbers necessary to clear the area without pulling from al-Basrah, and they were forbidden entry into the city proper by the Iraqi government due to negative outcomes of previous missions.[25] The Coalition achieved isolation by using concrete T-walls

[20] For more on the coordination of infantry and armor, see Tao-Hung Chang, "The Battle of Fallujah: Lessons Learned on Military Operations on Urbanized Terrain (MOUT) in the 21st Century," *Journal of Undergraduate Research* 6, no. 1 (2007): 31–38.
[21] David E. Johnson et al., *The 2008 Battle of Sadr City: Reimagining Urban Combat* (Santa Monica, CA: Rand, 2013), xv.
[22] "Manhattan Borough, New York County, New York," American Fact Finder, U.S. Census Bureau.
[23] Johnson et al., *The 2008 Battle of Sadr City*, 39.
[24] Johnson et al., *The 2008 Battle of Sadr City*, 10.
[25] Johnson et al., *The 2008 Battle of Sadr City*, 100.

to protect marketplaces and prevent JAM access to critical economic resources, while simultaneously manning combined security checkpoints to disrupt freedom of movement. Targeted raids destabilized JAM command and control and minimized extended missions that would result in disadvantageous and drawn-out fighting. The first struggle to influence the population was in developing an accurate understanding of the environment. As a deeply embedded and influential adversary, JAM essentially denied Coalition forces the ability to generate a significant human intelligence (HUMINT) network. Furthermore, Special Operations Forces (SOF) were unable to operate effectively in this environment because of the threat of rapid isolation by an overwhelming enemy force.[26] This difficulty was the result of al-Sadr's clear control of the city to the point that residents credited his presence with any improvements to their quality of life.[27] However, despite the historical reliance on al-Sadr and JAM to provide security and essential services, their brutality in subjugating the people created a seam for Coalition forces to exploit and influence the residents by providing them a better option for governance. As the battle continued, Coalition forces and ISF initiated a significant reconstruction effort.

Finally, with regard to employing ISF, the T-walls to isolate key markets and control JAM freedom of movement had another unintended consequence. JAM fighters understood the value of the access they lost and shifted to open battle in an attempt to maintain control of the area. In doing so, they exposed themselves to Coalition targeting, which allowed the Coalition and ISF to achieve a significant advantage.[28] As U.S. forces and ISF attrited JAM resistance, they gained significant access to a wealth of intelligence. U.S. forces were still prohibited from going into Sadr City proper, so ISF took the lead in developing intelligence throughout the city to weed out the remaining JAM leaders and operational elements.[29] This role supported the overall effort, but it also served to legitimize ISF and show their value to the

[26] Johnson et al., *The 2008 Battle of Sadr City*, 12.
[27] Johnson et al., *The 2008 Battle of Sadr City*, 26.
[28] Johnson et al., *The 2008 Battle of Sadr City*, 74–75.
[29] Johnson et al., *The 2008 Battle of Sadr City*, 84.

local populace. Further, ISF's role in the overall targeting apparatus grew. Some of their targets remained theirs to engage, several were handed off to the U.S. Army, and others were given to SOF for action. This ability to fully integrate the partner forces into operations is critical in areas where they have the best access and need the credibility gained from their involvement. It took significantly more effort for U.S. forces to convince the Iraqi government that conditions existed to provide security and essential services. However, once they did, conditions dramatically improved. ISF welcomed Iraqi police into the area to assist in providing law and order, the government collected trash off of the streets, and citizens felt as though they had a stake in their future and no longer had to react to JAM brutality.

Sadr City is a good example of finding novel solutions to complex problems in an urban environment. Rather than destruction and annihilation, U.S. forces found less devastating methods to achieve their objectives. This is not to say that there was not significant fighting in and around Sadr City. However, Coalition forces focused on denying JAM's critical requirements—freedom of movement and access to critical resources—and forced the insurgents to come out and fight. In doing so, U.S. forces and ISF did not have to destroy the city to save it. More important, the Coalition's main effort in al-Basrah continued its mission without being diverted due to problems in Sadr City. Reconstruction efforts and infrastructure that remained intact quickly increased the credibility of ISF and the government of Iraq. General Hammond's operational approach showed the applicability of creative thought in urban warfare. Though Sadr City represents only a fraction of what future combat in DUT or a megacity will entail, its lessons provide insight into what methods might be useful to avoid protracted war in extremely difficult urban terrain.

OPERATION IRAQI FREEDOM AND MOSUL

In Operation Inherent Resolve (Iraq and Syria, 2014), the 2016 counteroffensive in Mosul highlights the congestion of the battlespace in a DUT. During this coordinated operation, a myriad of military units and organizations swarmed through the area. Coalition forces were rep-

resented by elements of the Army's 101st Airborne Division and 82d Airborne Division participating in security force assistance (SFA) with U.S. Air Force joint terminal attack controller support, as well as Coalition forces supporting SFA in a training capacity. Army Civil Affairs and U.S. Department of State officials were conducting interorganizational and intergovernmental coordination to synchronize efforts through a delicate interstate division between the government of Iraq and Kurdistan Regional Government (KRG), while simultaneously coordinating the conduct of the Iraq Train and Equip Fund (ITEF).[30] The U.S. Agency for International Development (USAID) and other nongovernment organizations (NGOs) were involved in the humanitarian crisis and managing resumption of essential services as well as multiple camps of internally displaced persons. As the most engaged units in kinetic operations, the Coalition's SOF from seven nations were supporting foreign internal defense and conducting advise, assist, accompany, and enable operations with Iraqi and Kurdish security forces (ISF and KSF) throughout Kurdistan and eventually in Mosul as part of the operation. Even within American SOF, the Marine Special Operations teams and Naval Special Warfare task elements remained separate during the operation. While not nearly a comprehensive list of organizations and activities, it does highlight the complexity of the operating environment. Taken a step further, most of these agencies did not have formal command relationships at the tactical level that forced their coordination.

Coalition forces and interagency involvement complicated matters due to the number of competing equities; however, the primary fighters were ISF and KSF. Their interaction and coordination added yet another layer of difficulty and saturation. Units operating in the battlespace for ISF consisted of conventional Iraqi Army units, Iraqi SOF Counter-Terrorism Service, Iraqi Federal Police (IFP), IFP Emergency Response Divisions, Iraqi Air Force, and Popular Mobilization

[30] For more on the ITEF, see "U.S. Security Operation with Iraq," fact sheet, Bureau of Political-Military Affairs, U.S. Department of State, 20 January 2017.

Forces.[31] The KRG initially supported the Kurdish Peshmerga, Zerevani, and Asayish forces, among others, as they provided security and the initial thrust to begin the counteroffensive. In addition, local government officials and agencies became involved and empowered as control of areas surrounding and inside Mosul were reclaimed. The tension between Kurdish and Iraqi elements and leadership led to significant friction at times and highlighted the need for an intermediary to manage the relationship and operations. So, once again, multiple units with different chains of command reporting from separate and sometimes antagonistic organizations found themselves working toward common objectives.

The Coalition was fortunate to have experienced some earlier success in the region, due to several smaller-scale operations that occurred throughout the Tigris River Valley since 2014, but it still took some compromise to ensure unity of effort. Colocation was the critical factor that enabled a common operating picture and rapid decision making. The Kurdish leadership maintained the Kurdistan Regional Support Center (KRSC) that worked directly with conventional forces and SOF LNOs to share KSF disposition and operational information. The KRSC also coordinated access and movement through regional sectors to ensure force protection and logistics. All Coalition SOF units provided representatives to planning cells and a combined joint operations center (CJOC) to rapidly process, prioritize, and coordinate all operations and strike requests. This SOF CJOC was also colocated with the Coalition's joint operations center so that the director could quickly get accurate information about current battlefield conditions from forward SOF teams. All warfighting functions colocated to the maximum extent possible, and coordination meetings occurred daily or weekly, based on the key stakeholders' availability, to discuss progress and shortfalls. The consulate general conducted a biweekly

[31] Michael Knights and Alex Mello, "The Best Thing America Built in Iraq: Iraq's Counter-Terrorism Service and the Long War against Militancy," *War on the Rocks* (blog), 19 July 2017; Robert M. Perito, *The Iraq Federal Police: U.S. Police Building under Fire* (Washington, DC: U.S. Institute of Peace, 2011); "Iraqi Emergency Response Units Vital to Inner-city Security," Army.mil, 28 September 2009; and Renad Mansour, "More than Militias: Iraq's Popular Mobilization Forces Are Here to Stay," *War on the Rocks* (blog), 3 April 2018.

meeting to synchronize civil-military operations and remain aware of the reality of the situation. Once again, more coordination occurred than described here, but the critical element is that coordination at all levels and across all domains and functions happened continuously but informally. In the future, we will probably not have several small-scale events that serve as dress rehearsals for informal relationship building and structural development as combat operations take place. These considerations need to be considered before deployment to the theater and incorporated as much as possible into the joint manning document so that personnel requirements can correlate to actual line numbers.

FUTURE CONSIDERATIONS

Unified action by a broad organization of dissimilar agencies with a varied understanding of their counterparts is challenging. James C. McArthur rightly addresses the need for each organization to "clearly articulate its needs, resources, abilities, authorities, and, most importantly, its constraints."[32] However, *Interorganizational Cooperation* recognizes that "one difficulty of coordinating operations among USG departments and agencies is determining appropriate counterparts."[33] A proactive approach from mission leadership is necessary to identify the appropriate counterparts early and to connect these individuals at operational and tactical levels that are close to the problem. Brokering this relationship will enable honest dialogue between planners to fully understand the capabilities, authorities, and limitations of each contributor. SOF may have the relationships, access to key leaders, and authority to execute specific activities. Conventional forces may have the preponderance of fire support, aviation, and logistics, including medical support. USAID may have the resources to handle infrastructure challenges while other government agencies have the necessary intelligence information. However, approval authority for any activity may reside with the host nation via the country team. In this type of

[32] James C. McArthur et al., "Interorganizational Cooperation—Part I of III: The Interagency Perspective," *Joint Force Quarterly*, no. 79 (October 2015): 110.
[33] *Interorganizational Cooperation*, JP 3-08 (Washington, DC: Joint Chiefs of Staff, 2016), I-12.

situation, very similar to Mosul in 2016, planners must have detailed knowledge of who is operating in the battlespace, how they can best be employed to support the operational objectives, and how inputs into the system may result in disproportionate results for the other participants. Open sharing of information and colocating will be necessary to ensure data quickly makes it to the individual who it impacts the most or has the authority and ability to take action. Integrated planning between these organizations will add depth to problem framing and help identify key shortfalls across agencies before they materialize on the battlefield. Currently, ad hoc relationships yield positive effects in the operating environment, but agencies should formalize relationships early enough to allow personnel to develop working relationships and a shared vision.

Formal mechanisms to coordinate this activity currently lag behind the operational concepts, but *Interorganizational Cooperation* and the Army's *Multi-Service Tactics, Techniques, and Procedures* manual provide useful insights into how to manage this integration. Effectively coordinating efforts in the future will require exchanging LNOs with adjacent organizations operating in the battlespace. The Army's field manual recognizes that "LNOs are critical to a command's ability to coordinate, integrate, and deconflict CF [conventional forces] and SOF operations."[34] Though this publication specifically addresses military integration, these principles need to be carried over to the whole-of-government framework, especially when considering operations in DUT. Interorganizational Cooperation carries the idea further by recommending the joint staffs request LNOs and open dialogue with other agencies, or providing LNOs due to the limited manpower available to other agencies.[35] These LNOs need to be carefully selected individuals who have the credibility to speak and authority to act on their organization's behalf during critical times of battlefield friction when waiting for a decision from leadership will close a window of opportunity. In a complicated combat environment, the difficulty be-

[34] *Multi-Service Tactics, Techniques, and Procedures for Conventional Forces and Special Operations Forces Integration and Interoperability*, FM 6-03.05 (Washington DC: Department of the Army, 2010), 14.
[35] *Interorganizational Cooperation*, 10.

comes selecting a solid performer to leave the primary staff to serve as an LNO. However, selecting strong performers is critical to ensure operational and strategic success while encouraging interorganizational relationships based on mutual competence.

CONCLUSION

Through Operations Iraqi Freedom and Enduring Freedom, interagency, joint SOF, joint conventional forces, Coalition forces, and NGOs increasingly operated in the same battlespace. As future military operations continue to move into DUT, this level of concurrent activity is only going to increase as each agency is required to leverage their capabilities to support the operational objective. McArthur et al. highlight this need as it addresses the differences in interorganizational purpose, process, and people. The authors note that, when this "coordination is absent, DOD [Department of Defense] activities may lead local groups to develop unrealistic goals for future governmental interactions, leading to disappointment, resentment, and possible anger to the United States."[36] The requirement to rapidly identify which agency is the most capable to solve difficult problems is growing, and lower echelons at the operational and tactical level must embrace this coordination. Unity of effort is critical at these levels and is more difficult to achieve when enduring relationships between organizations do not exist.

[36] McArthur et al., "Interorganizational Cooperation," 108.

CHAPTER SEVEN

Joint Combined Arms Maneuver in the Megacity

Learning to Thrive in Chaos

Major Geoffrey B. Lynch, U.S. Army

Responding to urgent pleas for support in 2013, French military personnel carried out airstrikes in an effort to back the Malian government against extremists. For months, however, the Islamists remained unshaken by Western advances into the stronghold of a complicated urban environment. In the wake of significant shows of airpower, the civilian population paid the greatest penalty, trapped between two external factions fighting over the same territory with disparate end goals.

INTRODUCTION

Based on global urbanization trends, military operations will occur in a megacity sometime in the near future.[1] Megacities are defined by the United Nations (UN) as urban areas where the population exceeds 10 million. Today, 23 megacities are recognized globally, though current

[1] *Megacities and the United States Army: Preparing for a Complex and Uncertain Future, Staff Study* (Arlington, VA: Chief of Staff of the Army, Strategic Studies Group, 2014), 37.

data suggests there may be as many as 37 megacities by 2025.[2] This number will only increase if the upward trend continues as expected.[3] More than just the immense population densities, megacities have many other unique characteristics that distinguish them from smaller urban areas. As such, Title 10 of the U.S. Code clearly defines the legal responsibility of the armed forces, in this case the U.S. Army, to defend the nation and defeat any enemy on land responsible for aggressive acts toward the United States.[4]

Current Army doctrine, organizational structure, and training priorities do not account for the specific conditions units will encounter in a megacity, such as scale, connectedness, flow, density, and context.[5] Army and Joint doctrines for *Urban Operations* (UO) are a good starting point but are based on several false assumptions; for example, they posit that land forces can isolate an urban area or control an urban area externally and operate freely from the periphery.[6]

These assumptions fail to account for the highly connected human networks within the landscape, access to mass media platforms, rapid mobilization or swarm capabilities, and the sprawling and complex physical terrain.[7] To win in a complex environment (a megacity) as described in *The U.S. Army Operating Concept 2014* (AOC), the Army must adapt its current doctrine, training, and organizational structure. This concept proposes the creation of a multifunctional division that will specialize in Joint combined arms maneuver (JCAM) to create multiple dilemmas for future adversaries in complex urban environments.[8]

---

[2] For the purpose of this discussion, the terms *megacity* and *complex urban environments* are interchangeable. Some complex urban environments do not meet the 10-million people population criteria for a megacity as defined by the UN, but share the same complexities of megacities. The Gaza Strip or Mogadishu are examples of complex urban environments that do not meet the criteria to be classified as a megacity.

[3] David Shunk, "Mega Cities, Ungoverned Areas, and the Challenge of Army Urban Combat Operations in 2030–2040," *Small Wars Journal* (January 2014): 1.

[4] Armed Forces, 10 U.S.C. § 101, 112th Cong. (July 2011), 3,061–62.

[5] *Megacities and the United States Army*, 2.

[6] *Urban Operations*, FM 3-06 (Washington, DC: Department of the Army, 2013), I-10.

[7] *Megacities and the United States Army*, 2.

[8] *The U.S. Army Operating Concept: Win in a Complex World, 2020–2040*, TRADOC Pamphlet 525-3-1 (Arlington, VA: Department of the Army, 2014), 5.

CASE STUDIES

To gain fidelity and establish the logic to make specific recommendations to current Army doctrine, and ultimately contribute to a larger military concept, case studies were conducted on the Israel-Hezbollah War in 2006, French operations in Mali in 2013, and the Battle of Kismayo in 2008. Although these conflicts did not occur in a megacity as defined by the UN, parts of each campaign were waged in complex urban environments that resemble a megacity enough to qualify for consideration and analysis. Each conflict was analyzed based on three categories: doctrine, training, and organization. They were investigated from the perspective of the Israel Defense Forces (IDF), the French military, and the African Union coalition forces (Somali and Kenyan militaries and associated militias).

ISRAEL–HEZBOLLAH WAR

Background

In July 2006, after Hezbollah fighters kidnapped two IDF soldiers, war broke out between Israel and Hezbollah in Lebanon. The Israelis responded to the kidnapping with an extensive air campaign to destroy Hezbollah's ground-to-ground rocket capability and to force them into a position to release the two captured soldiers.[9] Although initially disrupted by the destructive air strikes, Hezbollah unleashed its own attack within 24 hours, launching an intense rocket salvo from southern Lebanon into Israel. Hezbollah's rocket campaign was highly effective, with more than 100 rockets falling on northern Israel daily. From the outset, the Israeli Air Force (IAF) had complete control of the air and conducted more than 12,000 sorties throughout the month-long campaign. Although they destroyed a large number of Hezbollah's long-range rockets, the IAF failed to slow the rate of rocket attacks.[10]

In the next phase of the operation, the IDF conducted a series of

[9] Spencer C. Tucker, ed., *The Encyclopedia of the Arab-Israeli Conflict: A Political, Social, and Military History*, vol. 2 (Santa Barbara, CA: ABC-CLIO, 2008), 616–17.
[10] Tucker, *The Encyclopedia of the Arab-Israeli Conflict*, 626–29.

limited-scale raids to destroy Hezbollah's short-range rocket capability and to disrupt its base of operations in the border region. The original ground plan of limited raids was quickly altered as Hezbollah had prepared a network of bunkers and defensive belts to ensure a protracted ground fight.[11] The war concluded with IDF forces penetrating deep into Lebanese territory but with no significant strategic effect.

The war with Hezbollah was considered a failure of the IDF by some inside and outside of Israel, based primarily on the fact that there had never been a clear strategy or declared definition of what success in the campaign entailed.[12] The IDF was unprepared for a high-intensity conflict with Hezbollah, which required a completely different mentality from that of the counterinsurgency strategy the IDF had implemented against Palestinian terrorists in Gaza for the past several years. In the 2006 conflict, the IDF demonstrated they were unfit to conduct combined arms battles that required the infantry (and special forces), armor, engineers, aviation, and artillery to synchronize their efforts in a complex urban environment.[13]

Intelligence Failures

The IDF's failures in intelligence were not a product of bad intelligence or a lack of intelligence. The problems occurred because of IDF's ineffective organizational structure and poor methods of disseminating intelligence. The Israeli intelligence community had vast knowledge of Hezbollah's military capabilities, disposition, composition, and strength. However, this information was not provided to the right commanders at the right times for it to be used effectively. For example, Israeli intelligence discovered an extensive bunker and tunnel system near the town of Maroun al-Ras but failed to distribute this information to the maneuver units on the ground. This lack of coordination was

[11] Matt M. Matthews, *We Were Caught Unprepared: The 2006 Hezbollah-Israeli War* (Fort Leavenworth, KS: U.S. Army Combined Arms Center, Combat Studies Institute Press, 2008), 43.

[12] Gilbert Achcar and Michel Warschawski, *The 33-Day War: Israel's War on Hezbollah in Lebanon and Its Consequences* (London: Paradigm Publishers, 2007) 37.

[13] LtCol Hany T. Nakleh, "The 2006 Israeli War on Lebanon: Analysis and Strategic Implications" (master's thesis, U.S. Army War College, 2007), 10.

a major factor in the high number of casualties sustained and in the IDF's tactical failures on the ground.[14]

Conversely, Hezbollah had a very effective intelligence preparation of the battlefield (IPB) process that included an open source intelligence collection and analysis center to examine Israeli and outside media sources. Hezbollah established listening posts and observation posts to report on IDF troop movement. Hezbollah employed Iranian-provided signal intelligence (SIGINT) capabilities in an attempt to monitor IDF traffic and were highly effective in monitoring unsecured platforms. They were ineffective in monitoring encrypted platforms, but for reasons unknown, the IDF often defaulted to unsecured platforms for communication.[15]

The IDF's insufficient development of human intelligence (HUMINT) caused information gaps in the IDFs' understanding of the complex human networks and the complicated relationships between Hezbollah, the Lebanese government, and the local population. Furthermore, their lack of HUMINT in support of unmanned aerial systems (UAS) resulted in excessive civilian casualties. [16]

Information Operations

When fighting in megacities defined by mass media and global connectedness, winning the information operations (IO) war is essential. The IDF's failure to establish an effective IO campaign led some in the media and international community to report the military action as illegitimate. According to after action reviews, many of the senior IDF officers and political officials did not understand the political and perceptual nature of this war. They lacked a targeted IO campaign directed toward the appropriate audiences to demonstrate that force was justified.[17] Ultimately, the IDF failed to convert tactical successes into political victories through IO.

---

[14] Amos Harel and Avi Issacharoff, *34 Days: Israel, Hezbollah, and the War in Lebanon*, trans. Ora Cummings and Moshe Tlamim (New York: Palgrave Macmillan, 2008), 133.
[15] Anthony H. Cordesman, *Lessons of the 2006 Israeli-Hezbollah War* (Washington, DC: Center for Strategic and International Studies, 2007), 142.
[16] Nakleh, "The 2006 Israeli War on Lebanon," 10.
[17] Cordesman, *Lessons of the 2006 Israeli-Hezbollah War*, 42.

Fires and Maneuver

The IDF struggled to fire and maneuver deliberately through the disaggregated but interconnected urban areas. Hezbollah's extensive subterranean network allowed for maneuvering of personnel and equipment as well as the penetration of IDF positions. IDF forces were constantly tied down in the built-up areas and could not effectively isolate Hezbollah forces. The IDF was never able to synchronize its efforts to allow for dynamic and focused maneuver of infantry and armor units.[18] Instead of synchronizing their combat power on multiple decisive points simultaneously to overwhelm the enemy, the IDF piecemealed their forces into the fight, and therefore achieved marginal results.

Conversely, Hezbollah did not remain static and defend terrain but combined its small arms, mortars, rockets, IO, and antitank weapons to successfully maneuver against the IDF.[19] Hezbollah used terrain to a great advantage in the conflict and built up urban areas as fortifications in conjunction with areas of broken and developed terrain.[20] Hezbollah's most successful defensive operations came from taking advantage of normal civilian buildings and built-up areas. These existing civilian structures provided the same level of cover and concealment as military fortifications but were much harder to detect, provided better exfiltration routes, allowed more mobility between positions, and favored a complex defense in-depth technique.[21]

Overreliance on Technology

Prior to the conflict, the IDF developed doctrine that had a misplaced reliance on precision munitions, long-range strike capabilities, and intelligence, surveillance, and reconnaissance (ISR) assets as a substitute for capable ground forces and human proficiency. The overuse of UAS without appropriate HUMINT support led to inaccurate strikes and unnecessary civilian casualties. The IDF preferred to rely on its standoff weapons to engage Hezbollah positions from afar, but they quickly realized this was not feasible in the urban areas they were op-

[18] Cordesman, *Lessons of the 2006 Israeli-Hezbollah War*, 137–38.
[19] Matthews, *We Were Caught Unprepared*, 44.
[20] Cordesman, *Lessons of the 2006 Israeli-Hezbollah War*, 15.
[21] Cordesman, *Lessons of the 2006 Israeli-Hezbollah War*, 19.

erating. This war demonstrated to Israel that high-tech systems could be avoided and deceived, while ground forces, especially infantry, special forces, and highly trained individual soldiers and teams are essential for operations in complex environments.[22]

Training

In the five years prior to the war with Hezbollah, the IDF conducted no major training exercises on combined arms maneuver in complex urban terrain. A distraught reserve armored battalion commander condemned the three IDF chiefs of staff "for having neglected land forces in favor of the air force, for sacrificing ground mobility on the altar of high-tech wizardry, and for squandering tank specialists in the nooks and crannies of the Intifada."[23] As was the case with airpower theorists prior to World War II, IAF commanders had misplaced confidence in the ability of strategic air power to unilaterally defeat a determined enemy. Therefore, most of the training repetitions and resources were dedicated to the Israeli Air Force.

Organization

The issues discussed above in terms of intelligence failures and an inability to maneuver were partly the result of a flawed organizational structure. The fact that the Israeli intelligence services had extensive knowledge of Hezbollah tunnel systems and defensive belts, but failed to distribute this information to the commanders on the ground, highlights a lack of integration between intelligence and operations.[24] The problems with integrating the various combat arms would be significantly improved with a better organizational model. The various arms worked well in isolation, as this is how the IDF was organized to operate. Instead of being organized under one unified organization (at the brigade or division level), they were organized separately and operated that way.

---

[22] Peter W. Singer, "Mike Tyson and the Hornet's Nest: Military Lessons of the Lebanon Crisis," Brookings, 1 August 2006.

[23] *Intifada* refers to the Palestinian uprising against Israeli occupation of the West Bank and Gaza. Matthews, *We Were Caught Unprepared*, 27.

[24] Harel and Issacharoff, *34 Days*, 133.

The IDF robbed their tactical air capability to dangerous levels in an effort to pay the strategic air component bill. Although the IAF conducted a very destructive air campaign with more than 12,000 sorties, the vast minority of these sorties were in support of ground maneuver. This demonstrates a major flaw with the IDF's integration and organization of tactical aviation and maneuver units.[25] Though the air campaign was labeled a success by most in the IDF, the level of success remains debatable if analyzed based on the strategic objectives it achieved—or failed to achieve in this case. The kidnapped IDF soldiers were never released or rescued, Hezbollah rocket fire was never suppressed, the extent of the IAF attacks inspired widespread condemnation, and a lack of close air support (CAS) left IDF ground forces bogged down with limited maneuver support from the air.[26]

Failure to Integrate Host Nation Partners

The IDF failed to develop a host nation partner to augment its organic capabilities. The IDF had an extremely valuable partner in the South Lebanon Army (SLA) that it worked with extensively to control the security zone in Southern Lebanon from 1985 to 1999.[27] The IDF made the decision to unilaterally attack Hezbollah and Lebanese infrastructure, adopting a strategy that Lebanon must be held accountable for Hezbollah's actions. The IDF's failure to develop an indigenous partner proved to be a catastrophic error and led to further miscalculations. However, host-nation integration was the strength of the African Union's campaign against al-Shabaab in the Battle of Kismayo.

KISMAYO

Background

The Second Battle of Kismayo was a combined military offensive led by Somali National Army forces (SNA) and African Union Mission in Somalia forces (AMISOM) mainly comprised of the Kenyan military and Ras Kamboni allies against al-Shabaab in the insurgent group's

[25] Matthews, *We Were Caught Unprepared*, 61.
[26] William M. Arkin, *Divining Victory: Airpower in the 2006 Israel-Hezbollah War* (Maxwell Air Force Base, AL: Air University Press, 2007), 151.
[27] Matthews, *We Were Caught Unprepared*, 9.

last major stronghold of Kismayo, Somalia. It began on 28 September 2012 with SNA and AMISOM forces conducting an amphibious landing approximately six kilometers north of Kismayo and then moving quickly inland to seize vital areas in the city.[28]

SNA and AMISOM naval, air, and ground forces were successful in seizing the city with little resistance mounted by al-Shabaab. Kismayo was regarded as a major stronghold for al-Shabaab based on the revenue the group was generating through charcoal exports and levying port taxes on imported goods. According to Al Jazeera, the offensive was a major "morale-dampening loss" for al-Shabaab, as the militants had few areas left from which to safely launch attacks on soft targets.[29]

Surprise

The amphibious assault conducted by SNA and AMISOM forces caught al-Shabaab completely by surprise. The ability to maneuver from the sea allowed the attacking forces to deal a decisive blow from a direction the rebels were not expecting. Residents, who remained in their homes as the battle continued, said the attack came from the air and sea and were shocked at how quickly it seemed to materialize.[30] As AMISOM and SNA forces conducted clearing operations in Kismayo's city center, many fighting positions and gun emplacements were found abandoned. This was a clear signal al-Shabaab had been prepared to mount a defense of the city but had anticipated the attack to come from a ground avenue of approach from the north.[31] When AMISOM attacked from the sea instead, al-Shabaab forces abandoned their positions.

---

[28] "Somali Militant Base of Kismayo Attacked by Kenyan Forces," BBC News, 28 September 2012.

[29] "Somali Militant Base of Kismayo Attacked by Kenyan Forces"; and "Troops Lay Siege to Somali Rebel Bastion," Al Jazeera, 28 September 2012.

[30] Clar Ni Chonghaile, "Kenyan Troop Launch Beach Assault on Somali City of Kismayo," *Guardian*, 28 September 2012.

[31] "Retreat of the Shabaab: Somalia's Militant Islamists Cede Territory," *Jane's Intelligence Review* 24, no. 12 (December 2012): 19.

Simultaneity

Kismayo had been a key supply route for al-Shabaab and a source of taxes the group collected. Income from the port had generated as much as $50 million a year from illegal trading.[32] In addition, the port represented a major conduit for smuggling weapons and other war-fighting materiel. With this in mind, AMISOM and SNA forces made it a priority to take control of the port as soon as possible.[33] To alleviate the pressure and send a strong message, the SNA and AMISOM moved to simultaneously seize the port, the key road intersections, and lines of communication (LOCs) north of the city, while the Ras Kamboni militia cleared the city center. The swift and simultaneous actions on these points of manipulation sent a strong psychological message to the local population and put al-Shabaab in multiple dilemmas from which they could not recover.[34]

Developing Nontraditional Alliances for Long-term Stability

An innovative technique that AMISOM used to prevent volatility in the wake of the takeover was to enlist support from some of the local clans or militias who had the allegiance of the people, but who could be brought onto the side of the government. One such militia with a significant effect in Kismayo was the Ras Kamboni, a paramilitary group active in southern Somalia who are vehemently opposed to al-Shabaab.[35] The Ras Kambonis were extremely effective at hunting down and rooting out the al-Shabaab cells that infiltrated back into Kismayo after the attack. The Ras Kamboni's contribution to the coalition was significant in securing a stable environment in Kismayo in the weeks and months after the operation.[36]

---

[32] Hamsa Omar, "Somalia Deploys Forces in Captured Former Al Qaeda Bastion," Bloomberg, 1 October 2012.
[33] Jeffrey Gettlemen, "Last Somali Militant Bastion Falls, Kenya Claims," *New York Times*, 28 September 2012.
[34] "Retreat of the Shabaab," 19.
[35] Gettlemen, "Last Somali Militant Bastion Falls."
[36] "Retreat of the Shabaab," 21.

Findings

Several important themes emerged from these case studies as it relates to operations in complex environments: the importance of simultaneous and coordinated maneuver and fires; the danger of overreliance on technology to win wars; and the importance of organizational structure to synchronize intelligence, IO, and combined arms. The case studies also demonstrated the importance of developing strong relationships with foreign partners through training and operations and the importance of training, specifically for operations in complex urban environments with a combination of conventional and special forces. The lessons learned from these case studies (along with French operations in Mali discussed later) were applied in the development of the following concept.

CONCEPT

Purpose

The purpose of this concept is to generate discourse and make recommendations to encourage further debate on how the U.S. Army will cope with the challenges associated with Joint Combined Arms Maneuver (JCAM) in complex urban environments. The U.S. military has proved through historical precedent in places like Fallujah, Iraq, and Hue City, Vietnam, that current doctrine for *Joint Urban Operations* is an appropriate source to guide commanders only in urban areas that can be isolated.[37] While some of the principles discussed in JP 3-06 and FM 3-06 are applicable for the megacity, this concept aims to develop solutions to the many challenges that have not been specifically addressed in doctrine.

Time Horizons, Assumptions, and Risks

Time Horizons

The recommended time horizon for this concept is in accordance with the chief of staff of the Army's planning guidelines outlined in the AOC

[37] *Joint Urban Operations*, JP 3-06 (Washington, DC: Chairman of the Joint Chiefs of Staff, 2013), III-18.

and nested within *Force 2025 and Beyond*.[38] With current data from the UN suggesting that there could be as many as 37 megacities by 2025, it seems logical to use 2025 as a planning factor for application of this concept.[39] While 2025 serves as a viable planning horizon, there are near-term requirements that would need to be implemented, such as short-term acquisition and technology development, implementation of the megacity as a training priority for regionally aligned forces (RAF), and any necessary changes to tables of organization and equipment (TO&E).

Assumptions

The following assumptions underlie this concept:

- Control and/or isolation of complex urban environments will be problematic if not unachievable.
- Based on current trends, U.S. forces will be required to conduct a combination of offensive, defensive, and stability operations in a megacity (or megacity-like complex urban environment) in the next 20 years.
- As the land component with limited strategic mobility, the Army is dependent on and complementary to the Joint force.
- JCAM requires U.S. integration with multinational partners to provide the cultural, operational, and environmental advantages required for success in a megacity.
- The current Army force structure will not support a counterinsurgency (COIN) campaign in the model of Iraq or Afghanistan.

Risks

The following risks must be considered and assessed as the development of this concept continues:

- Friendly force loss of control based on simultaneous and decentralized operations. Operations in complex urban

[38] *The U.S. Army Operating Concept*, i.
[39] Shunk, "Mega Cities," 1.

environments could involve multiple small-unit actions of various sizes and scopes that are executed simultaneously. These actions will be dependent on effective mission command and fire and maneuver control.
- To increase disaggregation, tempo, mobility, and simultaneity, Army forces risk degrading their ability to effectively mass.
- Additional risks may be incurred by delegating decision-making authority to lower echelon commanders.
- Host nation infrastructure and technology are unable to bridge the logistics gap.
- Reduction of traditional force protection measures (e.g., heavy personal gear, fortified forward operating bases, etc.) to maximize speed, mobility, and flexibility.

Description of the Problem

While urban areas are naturally problematic for military operations, megacities contain unique characteristics that distinguish them from normal urban areas. Factors that set megacities apart from other urban locales include global connectedness and immense metabolism rates in terms of resource intake and waste output.[40] Complex operating environments of the future—megacities—will be defined by resource limitations, rampant organized and disorganized crime, nonexistent governance and rule of law, wealth inequalities, extreme poverty, degraded infrastructure, disease, and pollution.[41]

In addition to its natural complexity, future adversaries will use the megacity's complex terrain to conduct conventional and unconventional warfare in an attempt to neutralize the overmatch of U.S. forces. State and nonstate actors will employ countermeasures to inhibit U.S. freedom of movement, such as integrated air defenses and urban defensive belts intermingled with civilian populations. Future adversaries will operate beyond the physical realm to avoid direct combat, using subversive techniques such as cyber and IO to diminish U.S. po-

[40] *Megacities and the United States Army*, 4.
[41] Shunk, "Mega Cities," 2.

litical will.[42] As was the case for the IDF in their conflict with Hezbollah in 2006, U.S. forces should assume future adversaries will possess the capabilities to degrade its technological advantages in such areas as long-range strike capability, UAS, and digital command and control.[43]

Synopsis of the Central Idea

This concept describes how the Army (through the creation of the multipurpose division) will integrate with the Joint force to create multiple dilemmas for its adversaries and ultimately defeat them, gain a temporal advantage, or create leverage by influencing multiple points of manipulation simultaneously. The Army (complemented by the Joint force) will create a multipurpose division that will specialize in JCAM in complex urban environments. As discussed in the AOC, "with unity of effort, the joint force can achieve access across all domains, land, maritime, air, space, and cyberspace to strike the enemy at an unknown time or location and create multiple dilemmas."[44]

Multiple Dilemmas

Creating multiple dilemmas involves dictating the terms of the operation with high-tempo operations, attacking with multiple arms at several points simultaneously to render adversaries incapable of responding effectively. The actions the enemy takes to avoid one attack will make them more vulnerable to another. To achieve multiple dilemmas, forces will operate in a dispersed manner over a wide area but maintain the ability to quickly concentrate their efforts through intelligence and operations integration.

JCAM and Points of Manipulation

JCAM is achieved by combining the capabilities of multiple arms or elements from one or more of the Services, other government agencies, and multinational partners to support maneuver across multiple domains to gain and maintain a relative advantage over adversaries. The Army, through the creation of the multipurpose division, will seize,

[42] *The U.S. Army Operating Concept*, 9.
[43] Singer, "Mike Tyson and the Hornet's Nest."
[44] *The U.S. Army Operating Concept,* IV.

maintain, and exploit the initiative on land as the Joint force maneuver element.[45] Points of manipulation are defined as any person, location, network, connection, entity, communications or information node, or logistical requirement that is essential to an adversary's ability to operate in a complex environment. By attacking, neutralizing, securing, influencing, or defeating these points of manipulation, the enemy will be thrown off-balance (physically, psychologically, or both) to the point they are rendered irrelevant. Some examples of points of manipulation in a megacity could be key leaders (e.g., uniformed, nonstate actor, criminal, or others), command and control nodes, ports, media or information centers, commerce centers, key LOCs, logistical hubs, or network intersections.

Multidomain Maneuver

Multidomain maneuver as described by Sun Tzu is: "Taking advantage of the enemy's unpreparedness; travel by unexpected routes and strike him where he has taken no precautions."[46] As our adversaries continue to develop antiaccess capabilities to degrade U.S. freedom of movement, the Joint community must maximize its expertise to create forcible entry forces equipped to maneuver across multiple domains simultaneously to strike the enemy in a manner for which they are unprepared.[47] The multipurpose division will be reliant on the Joint force to achieve multidomain dominance, especially as it relates to strategic mobility.

The Multipurpose Division

With a wide range of possible contingencies based on the uniqueness of each megacity, Army units conducting JCAM will require a versatile force structure tailored for the specific situation. The Army can achieve this by creating diverse and rapidly scalable formations based on the capabilities required to operate in complex urban environments. This diversity can be accomplished by replacing the bri-

[45] *The U.S. Army Operating Concept*, IV.
[46] Sun Tzu, *The Art of War*, trans. Samuel B. Griffith (New York: Oxford University Press, 1971), 134.
[47] *The U.S. Army Operating Concept*, IV.

gade combat team (BCT) with the division as the basic fighting unit of the Army. This simple, logical adaptation to the current force structure would organically provide all of the necessary capabilities including intelligence, aviation, engineering, IO, and cyber to the Joint task force (JTF) commander.

Another adaptation of the force structure is the integration of Special Operations Forces (SOF) into the division. This multipurpose division construct would provide the commander the flexibility of determining the appropriate SOF/conventional force ratio based on the situation and negate the tension that can exist between SOF and conventional forces. The AOC states that "forces tailored rapidly to the mission will exercise mission command and integrate joint, interorganizational, and multi-national capabilities."[48] Adopting the multipurpose division construct would allow the commander to scale up or down appropriately to create the right formula for each situation, while avoiding the tedious and awkward combining of various (nonorganic) BCTs and outside SOF units to form an ad hoc JTF.

The 4th Infantry Division is a perfect test unit to demonstrate this concept. As a hybrid organization, the 4th Infantry Division is well suited to operate as a JTF with its division headquarters, Stryker BCT, light infantry BCT, armor BCT, and organic aviation and engineer brigades. With the addition of a SOF company to the organization (hypothetically for the purposes of this concept), 4th Infantry Division would stand as the model multifunctional division.

Persistent Air Support

The persistent aviation support (PAS) concept is an emerging theory that would naturally complement JCAM in a complex urban environment. The PAS concept holds that helicopters, specifically attack helicopters and UAS, can be airborne and conducting operations 24 hours a day, seven days a week.[49] Besides the obvious advantage provided by fires and ISR, the mere presence of friendly aircraft (manned

[48] *The U.S. Army Operating Concept*, 15.

[49] CAP (without the concept part) is a term coined by Col T. J. Jamison, former commander of 82d Combat Aviation Brigade in Afghanistan, who provided much of the background information found in this chapter.

or unmanned) on the battlefield has a significant psychological impact on the enemy that can allow maneuver (ground) commanders to gain and maintain a position of relative advantage over the enemy.

With PAS, Army Aviation should be organized under the task force commander. This could be done in the fashion of the previous armored cavalry regimental structure to improve interoperability between air and ground forces through an enduring relationship and multiple training repetitions and to empower the PAS concept to support multipurpose divisions in a megacity. Within this framework, a UAS component should be organized under the aviation battalion. This will allow for a more complementary relationship between manned and unmanned systems at the unit level, as opposed to the current competing relationship.[50]

Balancing Technology and Human Investment

This concept advocates leveraging technological advancement but not at the cost of neglecting investment into the improvement of basic soldiering in both the cognitive and tactical sense. While emerging technologies in such areas as ISR, sustainment methods, precision strike capability, and digital command and control systems must be developed, fundamental shoot, move, communicate, and medical capabilities will continue to be the cornerstone of success in complex environments.

APPLICATION OF MILITARY FUNCTIONS

Fires and Maneuver

Multipurpose divisions operating in a megacity will favor the land force-centric tenets of tempo, mobility, simultaneity, adaptability, and lethality versus the protection-centric strategy of recent wars in Iraq and Afghanistan. Operations will be defined by disaggregation and disciplined small unit action with light infantry, SOF, and a large contingent of multinational forces working the interior of the megacity with heavier, mobile forces (Stryker and/or armor) on the periphery to interdict or restrict LOCs. Units will learn to flow with the natural me-

[50] Sickler, *Army Aviation*, 2.

tabolism of the area by blending in with indigenous security forces to reduce their signature in the interior, while maintaining a high level of mobility and firepower provided by organic aviation and wheeled and tracked platforms on the flanks to mass combat power when necessary to exploit opportunities. Soldiers and leaders of the multipurpose division will train to thrive in austere conditions and pride themselves on limiting their logistical requirements by exploiting the internal infrastructure of the megacity.

CAS should be robust and enduring in the megacity. Due to the physical and human terrain of the megacity, the effectiveness of artillery and mortars could be degraded in some cases. The PAS concept is one possible solution to the fires and ISR gap. PAS has the ability to restrict enemy freedom of movement and provide the means for ground commanders to conduct timely, informed maneuver.[51]

The multipurpose division, with its organic capabilities, would embody the core tenets of simultaneity, adaptability, tempo, mobility, and lethality. The division would have the unilateral ability to conduct simultaneous operations at a high tempo provided by the combined mobility and firepower of wheeled, armored, and rotary-wing capabilities and enhanced by the adaptability of SOF and indigenous forces. A recent historical example of what this concept aims to achieve was demonstrated by the French military in Mali in 2013. Although this operation did not occur in a megacity, the conditions were complex, and the French military provided several valid lessons, such as staying ahead of your adversaries' decision cycle through high-tempo and audacious actions and partner integration.

OPERATION SERVAL, MALI

French actions during Operation Serval in 2013 were defined by tempo, mobility, surprise, flexibility, and integration.[52] The French achieved strategic surprise and maintained the initiative by acting with greater audacity and speed than the Islamists. The French used a combination of SOF, commando and light units, and mechanized,

[51] Sickler, *Army Aviation*, 2.
[52] Michael Shurkin, *France's War in Mali: Lessons for an Expeditionary Army* (Santa Monica, CA: Rand, 2014), 2–3.

highly mobile forces with heavy fire power to attack multiple points of manipulation simultaneously. They moved at speeds that strained their logistical capabilities but maintained a high tempo that kept the Islamists off balance by creating multiple dilemmas. They demonstrated the importance of bold and constant movement, which retained the tactical initiative and prevented the enemy from targeting static positions.[53] Future multipurpose divisions should aim to employ this type of tempo and dynamic action in a megacity.

Mission Command

The mission command philosophy is ideal for conducting JCAM in a megacity if implemented properly. The idea of disciplined initiative at the lowest level is critical for leaders operating in decentralized and uncertain environments as in the megacity. Leaders must train repetitively through self-study, rigorous force-on-force exercises, simulations, staff rides, and leader professional development sessions to gain the confidence, trust, and common understanding to operate with degraded communications and thrive in chaotic situations. Furthermore, a training focus on cognitive ability, cross-cultural study, and language will provide a marked advantage to soldiers and leaders over potential adversaries.[54]

A significant challenge in exercising mission command in complex environments will be in establishing the appropriate command structure for specific situations and determining how mission command will translate to multinational and interagency partners. As it relates to the multifunctional division, it is a matter of establishing the right commander and headquarters depending on the level of responsibility, task force size, and personal background of a particular officer based on the situation. An example would be to insert an SOF officer as the JTF commander for an unconventional (megacity) problem set, even if the preponderance of the forces were conventional based on the SOF officer's background in urban warfare.

[53] Shurkin, *France's War in Mali*, 9–10.
[54] *The U.S. Army Operating Concept*, 18.

Intelligence

Similar to the IDF in 2006, U.S. Army intelligence sections (S-2) at the BCT and battalion levels are not sufficient for operations in complex environments. JCAM will require a more robust SIGINT and HUMINT capability to provide the commander an accurate and timely picture of an ever-changing situation.[55] Adopting the multipurpose division concept would alleviate many of the shortfalls based on a more robust intelligence section at the division level. However, new and innovative intelligence capabilities must be developed to counter the fast-paced and constantly changing conditions in a megacity; for example, a social media analyst could monitor social media traffic to maintain situational awareness and stay ahead of the enemy's swarm efforts. The multipurpose division will also require enhanced cyber capabilities, as argued by Major Joe Farina in his cyber levée en masse concept.[56]

Sustainment

Securing LOCs and supply lines in and out of a megacity will be problematic, if not impossible. However, the megacity also may offer some advantages in logistics. Just as the French sourced most of their fuel and Class I requirements from the local economy in Mali, U.S. multifunctional divisions can limit their logistical tail by foraging from the urban environment.[57] Regardless, the Army must develop technology (manned and unmanned) to minimize the ground LOCs, decrease risk to soldiers, increase freedom of movement, and allow for JCAM operations in the most austere conditions.[58]

Force Protection

The multipurpose division will leverage tempo, simultaneity, mobility,

---

[55] Maneuver Center of Excellence Reconnaissance and Surveillance Working Group, *75th Ranger Regiment: Problem Framing* (Fort Benning, GA: Department of the Army, n.d.), 16.
[56] Maj Joe Farina, "Cyberspace in the Megacity: Thickening the Fog of War?" (master's thesis, Marine Corps Command and Staff College, Marine Corps University, 2015), 5; and Audrey Kurth Croninn, "Cyber-Mobilization: The New Levee en Masse," U.S. Army, 10 September 2006.
[57] *Class I requirements* refers to rations for subsistence (food and drinking water) and gratuitous (free) health and comfort items. Shurkin, *France's War in Mali*, 34.
[58] *The U.S. Army Operating Concept*, 34.

adaptability, and lethality to provide the adequate measure of force protection. Operations in megacities will demand a decrease on the reliance of large fixed sites, such as combat outposts and forward operating bases as in the model of Iraq and Afghanistan. Multipurpose divisions should make use of roving urban patrol bases and existing infrastructure of the host nation security forces for temporary basing. The complex terrain and population density will not support the build-up of fixed sites based on their vulnerability to enemy attack, but existing host nation facilities provide ready-made areas to utilize as a base of operations in the megacity. To rapidly gain and maintain the initiative, units should avoid static positions, increase movement and situational awareness, deliver accurate fires, and develop lighter and more maneuverable gear.

Necessary Capabilities

Interagency Integration

The Army should continue the positive trend created in Afghanistan and Iraq of synchronizing, and in some cases supporting, the efforts of the other instruments of national power. David Kilcullen reinforces this point:

> There are still no purely military solutions to many of the challenges we will encounter, meaning that disciplines such as law enforcement, urban planning, city administration, systems design, public health, and international development are likely to play a key part in future theory of conflict.[59]

There are likely scenarios in a megacity where the multipurpose division could be the supporting effort and should be prepared to integrate with our interagency partners to support those missions.

Partner Integration

Leveraging host nation capabilities, cultural knowledge, tactics, infra-

[59] David Kilcullen, *Out of the Mountains: The Coming Age of the Urban Guerrilla* (New York: Oxford University Press, 2013), 114.

structure, and environmental awareness will be essential in all JCAM operations in a megacity. As highlighted in the 2010 case study on the pacification program in the favelas in Complexo do Alemão in Rio de Janeiro, Brazil, partnered forces could include the police, military, city officials, public works officials, or a combination of all.[60] Another example would be AMISOM's partnership with the Ras Kamboni militia to root out the remaining al-Shabaab forces and establish security in Kismayo. Multipurpose divisions may be inclined to partner with nontraditional groups in the future like the Ras Kamboni militia, who can contribute to creating multiple dilemmas.[61] The Army's multinational force partnerships will be strengthened greatly if the megacity is codified as a unit training priority.

Training

As discussed in the AOC and the Strategic Studies Group's analysis, the Army must institutionalize the megacity into the Joint training construct.[62] Furthermore, Title 10 mandates that the U.S. Army "is organized, trained, and equipped primarily for prompt and sustained combat incident to operations on land."[63] Megacities (and other complex urban environments) fall within this jurisdiction and should be addressed in the Army's training priorities.[64]

The next step is for the Army to implement the megacity as a training priority for each of the regionally aligned forces (RAF). This priority should be aligned with security cooperation initiatives and phase 0 efforts in accordance with the geographical combatant commander's (GCC) campaign plan. This would allow each of the RAFs to train with multinational partners (in the theater of operation) to gain competency, increase interoperability and access, and develop expert knowledge on the megacities located in their area of operation (AO). These Joint and combined training opportunities in a megacity could include anything from training exercises without troops, senior leader

[60] *Megacities and the United States Army,* 114.
[61] "Retreat of the Shabaab," 21.
[62] *Megacities and the United States Army,* 168.
[63] Armed Forces, 3,061–62.
[64] *Megacities and the United States Army,* 168.

staff rides, or force-on-force training with partner nations.[65] This training technique was validated by the French in Mali in 2013:

> France has been working with at least two Malian Tuareg forces, Haji ag Gamou's Malian Army units and the MNLA [National Movement for the Liberation of Azawad]. France's relations with Gamou's force and the MNLA, though not free from problems and controversies, suggest a high degree of familiarity with northern Malian affairs as well as the ability and willingness to engage local forces and, in effect, leverage internal Tuareg factional competition. French forces almost certainly knew what they were doing and with whom they were dealing before they arrived in Mali. They did not have to scramble to get up to speed.[66]

Home station training for multipurpose divisions (not in the RAF cycle) could be vastly improved by developing relationships with municipal agencies, police and fire departments, city planners, and public works officials of stateside urban areas to gain a better understanding of these disciplines.

SPATIAL AND TEMPORAL DIMENSIONS

Future threats in a megacity will be uniquely challenging and will be based on complex networks that are connected locally, regionally, and globally. Spatial and temporal dimensions for JCAM operations in the future will be defined differently at the operational and tactical levels. An example at the operational level is the 2008 terrorist attacks in Mumbai, India. Had the United States been compelled to take military action against this threat, it would most likely have required simultaneous actions in both Mumbai (on the attackers) and Karachi (the command and control center), and other locations (the support efforts) spanning the boundaries of multiple GCCs.[67] The geographic distance at the operational level adds a level of complexity, as the

[65] *Megacities and the United States Army,* 168.
[66] Shurkin, *France's War in Mali*, 34.
[67] "Mumbai Terror Attacks," CNN, 18 September 2013.

GCCs must coordinate and synchronize their actions across time, space, and resources.

Spatial and temporal dimensions at the tactical level will be defined by a specific megacity and the outlying areas. The multipurpose division is well-suited to meet various scenarios that could occur in a megacity as a self-contained task force or with augmentation. The multipurpose division will maintain the capability to apply SOF, light, armored, and Stryker infantry, as well as organic aviation for additional mobility, ISR, and CAS. The multipurpose division will maintain a robust staff to support the commander and will possess the required engineer and logistics assets to support high-tempo maneuver; for example, light infantry and/or SOF would work with multinational partners to blend in with the environment while engaging simultaneous targets and armored and Stryker forces provide a mobile cordon from the periphery. Along with aviation support through PAS, the multipurpose division could mass its combat power to exploit opportunities or operate in a disaggregate manner to engage simultaneous targets and create multiple dilemmas for the enemy.

Whether operating in a specific neighborhood in a megacity, or from multiple locations inside the same megacity, or across multiple regional boundaries as described above, Army forces must be prepared to synchronize simultaneous efforts while projecting combat power through all domains. Ultimately, this concept aims to provide options to the GCCs for contingencies in extremely complex environments like the megacity.

CONCLUSION

Based on current globalization trends, the Army will conduct a combination of offensive, defensive, and stability operations in a complex urban environment in the next 20 years. Whether the megacity consists of a population of 10 million or not is irrelevant. If the urban area is defined by population density, global connectedness, complex human networks, and urban sprawl, it meets the criteria of a complex urban environment and is a legitimate problem requiring further consideration by military planners.

Future armed conflict will continue to become more complex

based on the increasingly human nature of conflict, with threats emerging from dense and ungoverned urban areas, and the increased availability of lethal weapon systems. Enemies and adversaries will challenge U.S. forces in the land, air, maritime, space, and cyberspace domains. Advanced technologies will be transferred from state to nonstate actors. Because these threats tend to originate from densely populated urban centers, the United States cannot rely on technology and long-range strike capability alone to win its future wars. A capable and multifunctional combined-arms force will be required for operations in the chaotic and uncertain environments of the future.[68]

The multipurpose division is a logical and realistic adaptation of the current force structure that could be implemented in the near term to address the potential gaps in doctrine, organization, and training priorities. However, additional research, testing, and validation are required for future operations in megacities. As new information is absorbed, new questions will arise that need to be answered. Ultimately, this concept aims to grow the discourse and spark interest for further debate on how the Army will cope with the significant challenges associated with operations in complex urban environments.

[68] *The U.S. Army Operating Concept,* 34.

CHAPTER EIGHT

Cyberspace in the Megacity

Thickening the Fog of War?

Major Joseph I. Farina, U.S. Marine Corps

Cyber warfare in megacities flourishes because nation-states and nonstate actors can dig in and degrade much of the military's technological advantages. Consider the 2014 protests in Hong Kong: compact urban environment, tens of thousands of protestors, a volatile police force, and a government more concerned about its reputation as a safe enclave for commerce. The political cost of Beijing's unyielding position increased as footage of unarmed students in clouds of tear gas flashed around the world on a network that could communicate unhindered with millions in a moment.

In 2014, more than 40 percent of the world's population used the internet.[1] Cisco networking index predicts that the number of mobile network-connected devices will exceed 10 billion by 2018 and will be 1.4 times greater than the world's population (UN estimates 7.6 billion people by 2018).[2] As the cost of information continues to decrease, the capacity of nation-states, nonstate actors, and private citizens to

[1] "Internet Users," Internet Live Stats, 1 July 2016.
[2] Cisco, "Cisco Visual Networking Index Forecast Projects Nearly 11-Fold Increase in Global Mobile Data Traffic from 2013 to 2018," press release, 5 February 2014.

communicate increases. Information-sharing electronic devices and platforms, such as cellphones, Xbox 360, Twitter, and Facebook, and their associated networks interconnect nation-states, nonstate actors, and private citizens through cyberspace.[3]

Information-sharing electronic devices use cyberspace for connectivity. For a technologically advanced U.S. military, cyberspace provides the medium for command and control, communications, and weaponry employment. Conversely, cyberspace in the megacity provides adversarial nation-states and nonstate actors the same medium for command and control, communications, and weaponry employment. The impacts from nation-states and nonstate actors using cyberspace in the megacity diminish the U.S. military's technological advantage while increasing its level of uncertainty, the proverbial "fog of war," and friction.

The utilization of cyberspace by a megacity's citizens, with divergent interests and connected to different groups, thickens the fog of war for the U.S. military. Cyberspace, when compared to the doctrinal method of defining the battlefield, requires revaluation for utility within the cyberspace domain in reducing a maneuver commander's uncertainty. Additionally, nation-states and nonstate actors' mobilization through cyberspace, the Napoleonic cyber levée en masse, exploits megacity telecommunications infrastructure to converge at gaps within the U.S. military. Pointedly, cyberspace facilitates mobilization through transient mass. To analyze these topics and their effects in an environment of increasing uncertainty, one requires common definitions for the fog of war, the megacity, and the cyberspace domain. After defining key terms, this chapter then analyzes how the cyber battlefield and the cyber levée en masse thicken the fog of war and create critical challenges for the U.S. military. Using comparative analysis, this chapter analyzes two case studies for further cyber fog ex-

[3] *Cyberspace* refers to "the global domain within the information environment consisting of the interdependent networks of information technology infrastructures and resident data, including the Internet, telecommunications networks, computer systems, and embedded processors and controllers." *Cyberspace Operations*, JP 3-12 (Washington, DC: Joint Chiefs of Staff, 2013), v; and *Cyberspace Operations*, Annex 3-12 (Maxwell Air Force Base, AL: Curtis E. Lemay Center for Doctrine Development and Education, 2010), 1.

amination and lessons learned. Finally, this research concludes with a proposed military concept that explores potential courses of action to counter a megacity's transient mass.

DEFINITIONS

For the purposes of this chapter, the *fog of war* refers to "the uncertainty in situational awareness experienced by participants in military operations"; this includes uncertainty regarding an adversary's intent and capability as well as one's own capabilities.[4] This uncertainty leads to friction, which is what makes the easy tasks hard and the simplest of movements difficult. However, the size and scope of the megacity potentially compounds this effect.

A megacity, as defined by the United Nations and *New Scientist Magazine*, is a metropolitan area with a total population in excess of 10 million people.[5] Additionally, a megacity can be a single or multiple converging metropolitan areas.[6] Inherent to a megacity is transient mass. *Transient mass* refers to the ability of a city system to block, contain, or canalize friendly maneuver forces with organic people or devices on short notice.[7] However, coupling a basic understanding of the megacity with an understanding of the cyberspace domain further thickens the fog of war.

The global domains consist of land, air, sea, space, and cyberspace.[8] Considering the connectivity cyberspace offers, defining an area of interest and influence within a megacity becomes challenging. For example, consider a cyberattack originating from the Asia-Pacific,

[4] "Clausewitz's Fog and Friction and the Military Transformation Friction," *Conflict and Security* (blog), University of Nottingham, 2 December 2013; and Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976, 1984).

[5] *World Urbanization Prospects: The 2005 Revision* (New York: UN Department of Economic and Social Affairs, Population Division, 2006), fact sheet 7.

[6] Fred Pearce, "How Big Can Cities Get?," *New Scientist*, 17 June 2006, 41.

[7] Dr. Benjamin M. Jensen to Maj Joseph I. Farina, Marine Corps Command and Staff College, Marine Corps University, January 2015. The term *organic* refers to that which is assigned to and forms an essential component of a military organization.

[8] *Cyber Electromagnetic Activities*, FM 3-38 (Washington, DC: Department of the Army, 2014), 1-3.

transiting through a series of botnets in Europe, and targeting a Marine Expeditionary Brigade (MEB) conducting humanitarian assistance/disaster relief in Karachi, Pakistan.[9] How would the MEB intelligence officer and commanding officer define the MEB's area of interest and influence with regard to cyberspace? Considering the global connectivity and anonymity cyberspace offers, this task initially appears daunting.

CYBER AREAS OF INTEREST AND INFLUENCE: DOES UTILITY EXIST FOR A MANEUVER COMMANDER?

Doctrinally, the U.S. military defines the battlefield environment categorically into three areas: areas of operations, interest, and influence.[10] An *area of operations* (AOR) is "a geographical area, usually defined by lateral, forward, and rear boundaries assigned to a commander, by a higher commander, in which he has the responsibility and the authority to conduct military operations."[11] In cybersecurity, doctrinally known as *defensive cyberspace operations*, the AOR refers to a place "inside the firewall, proxy or quite simply, inside the [internet protocol] or domain space an entity owns."[12] However, the U.S. military possesses the ability to conduct offensive cyberspace operations and cyberspace intelligence, surveillance, and reconnaissance (ISR), in addition to defensive cyberspace operations.[13]

The issue for the U.S. military is where the authorities of a computer network attack and exploitation reside during operations in a megacity. Currently, a maneuver commander, whether in the megacity or a rural environment, does not possess the authority to conduct a

[9] " 'Bot' is derived from the word 'robot' and is an automated process that interacts with other network services. Bots often automate tasks and provide information or services that would otherwise be conducted by a human being." "What Is the Difference: Viruses, Worms, Trojans, and Bots?," Cisco, 14 June 2018.
[10] *Intelligence Preparation of the Battlefield*, FM 34-130 (Washington, DC: Department of the Army, 1994).
[11] *Operational Terms and Graphics*, FM 101-5-1 (Washington, DC: Department of the Army, 1997).
[12] Mathew Stern, "Applying Military Doctrine to Cyberspace: Area of Operations, Influence, and Interest," Security Week, 12 September 2012, 1.
[13] *Cyberspace Operations*, II-4, GL-4.

computer network attack, therefore eliminating a cyber AOR. Furthermore, computer network attacks and exploitation can originate from any location globally with an internet connection. Additionally, given diaspora networks and sympathy groups, the actual network targeted may only exist partially in physical form within the boundary of a megacity. Therefore, there is limited utility in defining a cyber AOR. Even if a maneuver commander authorizes a computer network attack within the megacity, cyberspace poses additional challenges to the utility of a cyber area of influence.

The area of influence is "a geographical area wherein a commander is directly capable of influencing operations by maneuver or fire support systems normally under the commander's command or control."[14] The area of influence includes both organic and "supporting combat power, to include joint, multinational, or interagency assets."[15] When employing organic kinetic weapons, the joint definition is comprehensible. However, when operating in a globally connected domain such as cyberspace, a cyber area of influence appears irrelevant since cyberspace is global. The cyber area of influence in the megacity thus reaches worldwide, regardless of where the authorities reside. Therefore, the utility of the cyber area of influence within the cyberspace domain is questionable, leaving the area of interest for later debate.

The area of interest "includes the area of influence, areas adjacent thereto, and extends into enemy territory to the objectives of current or planned operations. This area also includes areas occupied by enemy forces who could jeopardize the accomplishment of the mission."[16] Matthew Stern argues that the area of interest in cyberspace is comparably the enemy's "cyber infrastructure such as botnets, crime ware and actor/group/nation states."[17] This viewpoint fails to include that in the globally connected domain of cyberspace, the enemy could operate from another country, from another conti-

[14] *Operational Terms and Graphics*, 1-12.
[15] *Operational Terms and Graphics*.
[16] *Operations*, FM 3-0 (Washington, DC: Department of the Army, 2008), 5-5.
[17] Stern, "Applying Military Doctrine to Cyberspace," 1.

nent, or from within the United States.[18] However, Stern and Johan Sigholm accurately explain that nation-states and nonstate actors will play a role in cyberspace.[19]

In the megacity, nation-states and nonstate actors will impact whether an adversary accomplishes their mission through cyberspace. For example, in October 2014, the hacking group Anonymous conducted cyberattacks against China in response to China's crackdown on prodemocratic protesters. Comparatively, Hong Kong's prodemocratic protesters used cyberspace for mobilization at the gaps of antiprotesting forces' security.[20] Although areas of operations, influence, and interest relate to cybersecurity, in a global domain that offers nation-states and nonstate actors anonymity, they are of limited use. However, future nation-states and nonstate actors will use mass communication mediums for mobilization within a megacity, similar to how Napoleon Bonaparte mobilized his troops during the French Revolution, thereby increasing their ability to muster and generate mass while increasing uncertainty for the U.S. military.

FROM THE BASTILLE TO THE MEGACITY: THE CYBER LEVÉE EN MASSE

A political and social phenomenon undertaken during the French Revolution and elaborated on by Napoleon was mass conscription, or levée en masse. Prior to Napoleon, large armies were socially and politically challenging. Under France's previous regime, the working, middle, and upper classes were exempt from military service. This limited and deprived mass armies since there was only a small segment of the population to draw from.[21]

---

[18] Sangwon Yoon, "North Korea Recruits Hackers at School," Al Jazeera, 20 June 2011.

[19] Johan Sigholm, "Non-state Actors in Cyberspace," *Journal of Military Studies* 4, no. 1 (2013): 3.

[20] Menchie Mendoza, "Anonymous Supports Hong Kong Protests, Leaks Data from Chinese Websites," *Tech Times*, 14 October 2014.

[21] Joseph I. Farina, "Evolution to Warfare to 1945" (unpublished manuscript, 17 October 2014), 1–2; Hew Strachan, *European Armies and the Conduct of War* (London: George Allen and Unwin, 1983), chapter 4; and Peter Paret, "Napoleon and the Revolution in War," in *Makers of Modern Strategy: From Machiavelli to the Modern Age*, Peter Paret, ed., with Gordon A. Craig and Felix Gilbert (Princeton, NJ: Princeton University Press, 1986), 123–42.

However, starting in 1800, Napoleon coupled mass recruitment and nationalist passion in forming his revolutionary armies. The vast increase in the production of citizen soldiers facilitated not just France's foreign policy but the French commander's ability to fight more aggressive and costly campaigns.[22] Dr. Audrey Kurth Cronin and David Kilcullen argue that "it is no accident that the rise of mass warfare coincided with a huge explosion in the means of communication, particularly a dramatic growth in the number of common publications such as journals, newspapers, pamphlets, and other short-lived forms of literature."[23] In the twenty-first century, globally connected websites, text messages, internet blogs, and social media replaced the Napoleonic fervor expressed though paper-based printed documents.

There are approximately 4.2 billion internet users worldwide. In locations where computer access or landline phones are limited, cellular conductivity likely exists. Moreover, "the number of unique mobile subscribers will reach 5.9 billion by 2025, equivalent to 71% of the world's population" with more than half of mobile subscriptions located in the Asia-Pacific.[24] Considering the vast amounts of telecommunications systems available, coupled with the number of subscribers, nation-states and nonstate actors operating within the megacity will likely use cyberspace to mobilize within the megacity construct.

NATION-STATES AND NONSTATE ACTORS' CYBERMOBILIZATION

Timothy L. Thomas, Cronin, and National Gang Intelligence Center's *National Gang Report for 2011 and 2013* elaborate on the ability, ubiquity, and mobilization cyberspace offers nonstate actors. Nonstate actors use cyberspace for motivation, recruitment, collaboration and coordination, expansion of social networks, training, and dissemi-

[22] Farina, "Evolution to Warfare to 1945," 2.
[23] Audry Kurth Cronin, "Cyber-Mobilization: The New Levee en Masse," *Parameters* (Summer 2006): 1; and Kilcullen, *Out of the Mountains*.
[24] *The Mobile Economy, 2018* (London: GSMA, 2018), 2.

nating propaganda.[25] Additionally, cyberspace provides nonstate actors a low-cost menu that includes social networks, mass texts, chat rooms, and websites, among many others, to communicate. As the cost of information decreases, the capacity of actors to spread their messages radically increases. In *Out of the Mountains*, Kilcullen supports Cronin's argument that a "democratization of communications, an increase in public access, a sharp reduction in cost, a growth in frequency, and an exploitation of images to construct a mobilizing narrative" are critical elements in the proliferation of information.[26] In the megacity, cyberspace offers nation-state and nonstate actors an opportunity to rapidly mobilize and converge that was created by the "democratization of communications."[27]

In December 1999, the internet facilitated maneuver for World Trade Organization protestors by allowing "net-recruited protestors to converge on Seattle in all directions."[28] Additionally, as Kilcullen explains, when "infesting the megacity," the Mumbai terrorists used Skype, cellular, and satellite telephones to communicate with their handlers, who used Twitter, news blogs, satellite news, and cable television to control the attacks.[29] Kilcullen and Thomas identify "flat" hierarchal structures and control operations conducted through remote control as key factors facilitating mobilization and convergence.[30]

BACK TO THE FUTURE: PAST CYBER ACTIVITIES DEPICT AN INCREASE IN UNCERTAINTY

When considering the size and scope of the megacity, coupled with the proliferation of globally connected telecommunication devices, the utilization of cyberspace by citizens of a megacity thickens the

[25] *2011 National Gang Threat Assessment* (Washington, DC: Federal Bureau of Investigation, 2011); Timothy L. Thomas, *Cyber Mobilization: A Growing Counterinsurgency Campaign* (Maxwell Air Force Base, AL: Joint Information Operations Center, 2006); and Cronin, "Cyber-Mobilization."
[26] Cronin, quoted in Kilcullen, *Out of the Mountains*, 207.
[27] Cronin, "Cyber-Mobilization."
[28] Thomas, *Cyber Mobilization*, 23.
[29] Kilcullen, *Out of the Mountains*, 62.
[30] Kilcullen, *Out of the Mountains*, 62; and Thomas, *Cyber Mobilization*, 23.

fog of war for the U.S. military. Cyberspace facilitates mobilization and convergence on U.S. military gaps while increasing maneuver forces' uncertainty. However, as Kilcullen, Thomas, Cronin, and Stern identify, the use of cyberspace is not limited to citizens, but rather utilized categorically by nation-states and nonstate actors.

Once refined, cyberspace within the megacity allows nation-states and nonstate actors to use transient mass for mobilization and convergence on a technologically superior adversary, thereby creating a denser fog of war and adding friction to an adversary's operations. To mitigate the effects of transient mass and to reduce uncertainty and diminish the fog of war, the U.S. military must create operational- and tactical-level capabilities to effectively process and synthesize the vast amounts of disaggregated information within cyberspace. To fully appreciate the use of cyberspace to create transient mass to thicken the fog of war, one does not need to look far into the distant past for examples of nation-states and nonstate actors using cyberspace within a megacity construct.

Examples worth further research include the 2008 Mumbai attacks and the cyber operations by North Korea targeting Seoul, South Korea. Additionally, researching nation-states and nonstate actors' use of cyberspace outside the megacity construct, such as the 2007 cyberattacks on Estonia, the 2007 cyberattacks on South Ossetia, and the 2014 Hong Kong protests are worthy of exploration. Only further research, and its associated findings applicable to military operations within a megacity, will promote visibility through the cyber fog.

COMPARATIVE ANALYSIS: CASE STUDIES OF MUMBAI AND HONG KONG

A megacity, given its high population density and connectivity, allows the temporary horde of people and swarm of devices, or amalgamation of the two, to mobilize and converge at preplanned locations to impact operations and further escalate the fog of war. To best analyze the potential effects of transient mass on American forces, one must first study current examples of transient mass against host-nation security forces.

Apropos examples used for comparative analysis were the 26 November 2008 Mumbai attacks and the 2014 Hong Kong protests. These events were selected due to their notoriety for using modern technologies and information-sharing devices, particularly those that connect to and interact through cyberspace. The research included Google search queries consisting of "Mumbai+attacks+technology" and "Pakistan+terrorist+VOIP" to retrieve relevant news stories and analysis on the 2008 Mumbai terrorist attacks.[31] For relevant news stories and analysis on the 2014 Hong Kong protests, analysis included Google queries of "Hong Kong+protests" and "Hong Kong+protest+technology." Note that the preponderance of Hong Kong protest articles referenced the use of modern technologies for communications and mobilization throughout.

Research for this chapter relies on analysis of more than 40 published reports and articles, including press releases and India's investigative report to Pakistan. Although additional published reports and articles are available, these publications corroborate those already under analysis. Additionally, research on the 2008 Mumbai terrorist attacks includes documents held at the U.S. Marine Corps Alfred M. Gray Research Center: Cathy Scott-Clark and Adrian Levy's *The Siege: 68 Hours Inside the Taj Hotel*, David Kilcullen's *Out of the Mountains*, and Pauline C. Reich and Eduardo Gelbstein's *Law, Policy, and Technology: Cyberterrorism, Information Warfare, and Internet Immobilization*.[32]

The goal of the research is to identify the emergent characteristics of modern cyberconflict by analyzing similar forms of modern technologies connected through cyberspace by both the 2008 Mumbai terrorists and the 2014 Hong Kong protesters. Furthermore, this research analyzes how both groups' use of modern technologies enables mobilization and convergence at preplanned locations. We will examine an actor's use of modern technologies with the intent to

[31] VOIP refers to voice over internet protocol.

[32] Cathy Scott-Clark and Adrian Levy, *The Siege: 68 Hours Inside the Taj Hotel* (New York: Penguin Books, 2013); Kilcullen, *Out of the Mountains*; and Pauline C. Reich and Eduardo Gelbstein, *Law, Policy, and Technology: Cyberterrorism, Information Warfare, and Internet Mobilization* (Hershey, PA: Information Science Reference, an imprint of IGI Global, 2012).

look beyond simply identifying the specific type. Finally, were there host-nation security forces' reactions that occurred through cyberspace? If so, how did the Mumbai terrorists and Hong Kong protestors counteract the host-nation's reactions? Answering these questions and drawing lessons learned from each event potentially discerns an adversary's most likely course of cyber action. Prior to moving forward with the analysis, we will offer some context on each event and their cyber similarities.

Background and Similarities

Mumbai is a megacity in the state of Maharashtra, India. Mumbai is the fourth largest city in the world with a population of 22 million and is India's most populous city.[33] In the evening hours of 26 November 2008, 10 Lashkar-e-Taiba terrorists attacked multiple locations within Mumbai, including the Taj Mahal Palace Hotel, the Oberoi Hotel, the Nariman House, the Chhatrapati Shivaja Terminus railway station, and the Leopold Café.[34] The attacks resulted in the deaths of 183 people, including 14 police and security forces, and left more than 300 people injured.[35] A unique facet of the Mumbai attacks was the use of information-sharing devices by the terrorists and their handlers. Fred Burton and Scott Stewart pointedly state that "perhaps the most revolutionary aspect of the Mumbai attacks was the assailants' use of modern technology to assist them with planning the attack and with their command, control and communications during the execution of their operation."[36] Modern technologies, such as information-sharing devices interconnected through cyberspace in Mumbai, also characterize command, control, and communication during the 2014 Hong Kong protests.

Hong Kong is a city at the southeastern tip of mainland China. As one of the most densely populated cities in the world, Hong Kong has

[33] "Mumbai Population 2018," World Population Review, 13 February 2018.

[34] Founded in the early 1990s, Lashkar-e-Taiba represents one of the largest, most active Islamic terrorist organizations that operates primarily out of Pakistan. Rama Lakshmi, "Indian Investigators Reveal Details Culled from Arrested Gunman," *Washington Post*, 3 December 2008, 2.

[35] Reich and Gelbstein, *Law, Policy, and Technology*, 378.

[36] Fred Burton and Scott Stewart, "Mitigating Mumbai," Stratfor, 14 January 2009, 2.

a population of more than 7.43 million people with a density of 6,650 people per square kilometer.[37] The September 2014 protests began when the National People's Congress's Standing Committee for the People's Republic of China released its framework for Hong Kong's 2017 chief executive election. At the core of the issue is the Standing Committee's "[expectation] to endorse a model under which only two or three candidates may run for office once they have secured the support of at least half of a 1,200 nominating committee."[38] Hong Kong citizens could only cast their votes on the committee's approved candidates. This decision was unacceptable to Hong Kong residents; as a result, demonstrations and protests commenced on 22 September 2014. Equipped with "top-of-the-line phones on some of the world's fastest mobile networks," Hong Kong protesters mobilized at a pace that "older generations of activists could have only dreamed of."[39]

By analyzing both the 2008 Mumbai terrorist attacks and the 2014 Hong Kong protests, similarities between the two events shed light onto the use of cyberspace for mobilization and convergence, increasing uncertainty and friction for host-nation security forces. First, the Hong Kong protestors' use of cyberspace facilitated the creation of a transient mass assembling at preplanned locations, similar to the Mumbai terrorists' use of modern technologies to converge on the selected target locations. Handheld cellphones were the primary medium used in each incident. This implies that the decreasing cost of information enables an adversary to generate mass locally faster than the counterforce, whether expeditionary unit or local police, can generate combat power.

Second, the Hong Kong cyber-enabled protesters surprised Hong Kong security forces by coordinating the masses through cyberspace. This was not just a mob but coordinated action. Although characterizing this action as decentralized planning and execution, it is still coordinated. Similarly, the Mumbai terrorists' use of cyberspace

[37] "Hong Kong Population 2018," World Population Review, 12 June 2018.
[38] Tony Cheung, "Hong Kong's Candidate Nominating System Out of Balance, Says Beijing Scholar," *South China Morning Post* (Hong Kong), 31 August 2014, 1.
[39] Wilfred Chan, "Cellphones and Umbrellas: Protesting Hong Kong-style," CNN, 29 September 2014.

for planning surprised Mumbai security forces. The terrorists' ability to mobilize and converge by using cyberspace to command, control, and communicate overwhelmed Indian security forces.

Third, not only did both parties use the already established host-nation cyber infrastructure, but both the Mumbai terrorists and the Hong Kong protesters counteracted host-nation reactions to the incidents through the use of that host-nation's cyber infrastructure. Most notably, the attack planners and the protesters' counteractions occurred by monitoring social media and news outlets reporting law enforcement and security forces' locations.

Similar Modern Technologies for Mobilization and Convergence

The 2008 Mumbai attack planners made use of India's already established cellular network and Thuraya's mobile satellite network. The terrorists' use of cellular phones, specifically voice communications and text messages, for command and control permitted convergence at their preplanned targets.[40] Additionally, issuing additional subscriber identity module (SIM) cards of Indian and U.S. origin to three of the terrorists facilitated initial anonymity.[41] The terrorists' handlers, located in the Kashmir area under Pakistani control, solely used voice over internet protocol (VOIP) phone services.

To achieve initial anonymity, Zarrar Shah, the Mumbai terrorists' computer expert, purchased these VOIP services through Callphonex, a New Jersey company, to ensure the majority of his calls would bear the 201 area code when intercepted.[42] The types and methods of communications employed by the Mumbai terrorists were "clearly a few steps if not a generation ahead of what the [Indian] police had," thus compounding the levels of uncertainty and friction of the host-nation.[43] As Scott-Clark and Adrian Levy depict in *The Siege*, "the

[40] Indian Government Dossier, "Mumbai Terrorist Attacks, Nov. 26–29, 2008," *The Hindu*, January 2009, 9, 52.
[41] Kilcullen, *Out of the Mountains*, 53–54.
[42] "26/11 Mumbai Terrorist Attack: LeT Tech Chief Posed as Indian Businessman to Buy VoIP," *First Post* (Mumbai), 22 December 2014.
[43] Reich and Gelbstein, *Law, Policy, and Technology*, 396.

gunmen in Mumbai appeared to be dialing Austria, and receiving calls from a number in the United States."[44] Consequently, Indian security forces encountered "an internet telephone network, with gunmen in India dialing a remote hub that re-routed the calls to their handlers, and vice versa."[45] Additionally, the Mumbai terrorists used Garmin global positioning systems (GPS), with preloaded waypoints, to navigate from the shores of Pakistan and through their amphibious landing near the fishing villages of South Mumbai for mobilization and convergence on their respective targets in downtown Mumbai.

Similar to the Mumbai terrorists, the Hong Kong protesters mobilized and converged their forces, the masses of protestors, at preplanned locations through the use of existing cyber infrastructure, relying mostly on cellphones and social media for planning, command, control, and communications. Hong Kong averages more than two cellphones per user, with an overall mobile subscription rate of 237 percent; therefore, a common communications medium for the masses already existed.[46] In addition to cellphones, Hong Kong protesters took advantage of Twitter (#OccupyCentral and #UmbrellaRevolution), Facebook, and Weibo, China's version of Twitter, to direct and navigate the masses as well as to report Hong Kong security forces' actions.[47] Therefore, Hong Kong's dense connectivity allowed for better coordination (and generation) of transient mass.

Through the use of modern technologies, primarily cellphones and internet-connected, information-sharing devices, the Mumbai terrorists and the Hong Kong protesters rapidly mobilized and converged on their respective locations. In Hong Kong, protestors "clutching glowing smartphones, used group chats apps like WhatsApp and Firechat" to establish hasty protests. Roughly 1,000 protestors, most who had just viewed the social media posts, suddenly "flooded the main road in Hong Kong's Mong Kok shopping district, leaving police

[44] Scott-Clark and Levy, *The Siege*, 166.
[45] Scott-Clark and Levy, *The Siege*, 166.
[46] Andrew Lih, "In Hong Kong's Protests, Technology Is a Battlefield," *Quartz*, 2 October 2014.
[47] Douglas Yeung and Astrid Stuth Cevallos, "The Mountain Is High and the Emperor Is Far Away," *Foreign Policy*, 11 November 2014, 2.

surprised and outnumbered."[48] Comparatively, as assessed by former Indian special secretary Vappala Balachandran, a member of the two-man high level committee appointed to investigate the incident, the 2008 Mumbai attacks marked "the first time terrorist handlers actively guided attacks from Pakistan through cell phones."[49] Akin to Hong Kong protestors' use of social media, the Mumbai terrorists viewed news and social media, primarily Twitter, for up-to-the-minute information on Indian security forces' locations, international reactions, and locational information, such as Taj Mahal Hotel floor and room numbers, from trapped guests and civilians.[50] Therefore, considering that the Hong Kong protestors and the Mumbai terrorists successfully employed modern technologies to mobilize and converge, what were the host-nation and security forces' reactions?

How Did Host-Nation's Security Forces React?

The Indian security forces' reaction to Lashkar-e-Taiba's actions focused primarily on halting the attacks occurring throughout Mumbai. However, Indian security forces also commenced communications intelligence collection, particularly targeting Global System for Mobile communications (GSM) cellphone numbers, such as the GSM phone number +91 9910 710 424 used between the Pakistan-based handlers and the attackers in the Taj Mahal Hotel. Through collection, exploitation, and analysis, Indian security forces determined the terrorists' locations through the terrorists' own reporting to their Pakistan-based handlers. Due to the handlers' use of satellite and VOIP communications, Indian security forces were incapable of ascertaining the handlers' location, thereby increasing friction to security operations.[51] A former Indian naval commander and retired director of the Indian Institute of Defence Studies and Analyses states, "the se-

[48] Chan, "Cellphones and Umbrellas."

[49] Vappala Balachandran, "Dealing with Aftermath of Attacks: Lessons from Mumbai and Elsewhere on What to Do and What Not to Do" (presentation, Pluscarden Programme Conference: The Future of International Cooperation in Countering Violent Extremism, Oxford University, October 2010), 3–4.

[50] Balachandran, "Dealing with Aftermath of Attacks," 2.

[51] Jeremy Kahn, "Mumbai Terrorists Relied on New Technology for Attacks," *New York Times*, 8 December 2008, 1.

curity forces in India, a country renowned for its huge supply of world class computer programmers, are especially weak in cybersecurity," and can only intellectually and theoretically track satellite communications, emails, and phone calls over the internet.[52] However, would it not better serve Indian security forces to deny the terrorists' use of the cyber infrastructure?

This research did not find any reference to Indian security forces attempting to disable the cyber infrastructure, bar cellular access, shut off power to cellular towers, or interfere/jam cellphones. Additionally, access to the cyber infrastructure remained available due to the plethora of intelligence gained from the terrorists' communications, reports from civilians through Twitter to Indian security forces, and the Indian security forces' use of the cyber infrastructure for their own communications. As internet security expert Bruce Schneier explains, "[communications] infrastructure is especially valuable during a terrorist attack. Twitter was the best way for people to get real-time information about the attacks in Mumbai. If the Indian government shut Twitter down . . . during a terrorist attack, the lack of communications for everyone, not just the terrorists, would increase the level of terror and could even increase the body count."[53] Therefore, maintaining open access to the cyber infrastructure, according to Schneier, may actually decrease situational uncertainty and the level of friction encountered. While Indian security forces' approach to collection, exploitation, and analysis were simplistic, Hong Kong's approaches were complex.

While Indian security forces were severely limited in their cyber collection, exploitation, and analysis abilities, Hong Kong security forces exhibited state-of-the-art cyber responses to protesters. Protesters using the social media website WhatsApp for planning, command, control, and communications received an advertisement offering to better coordinate protests. However, protesters had actually installed malicious software (malware) onto their smartphones. Of Chinese government origin, the malware exploits the phone's con-

[52] Reich and Gelbstein, *Law, Policy, and Technology*, 396.
[53] Reich and Gelbstein, *Law, Policy, and Technology*, 385.

tent and delivers its stored information to suspicious websites whose servers are in mainland China. For iPhones, the malware has the sophistication to overcome the Apple default applications, a technique referred to as "jailbreak."[54] The culprits of the malware then collected the voice conversations of their targets. Beyond the technical abilities of the Indian security forces, the malware originators captured sound, tracked locations, and analyzed contacts, messages, and photos in an effort to thwart future protests and disrupt coordination efforts. However, the sheer number of protesters, a transient mass approaching several thousand to half a million people, converging with precision at preplanned locations though cyberspace, were no match for the 30,000-strong Hong Kong security forces regardless of the cyber techniques used.[55] Similar to the Indian security forces' dilemma, why did Hong Kong security forces allow continued access to its cyber infrastructure?

Hong Kong is "connected to the outside world through a commercially competitive and decentralized communications infrastructure."[56] Although civilian rumors circulated of censorship and Hong Kong forces threatened to shut down cellular towers, the cyber infrastructure remained operational. Research determined that the decision to allow the Hong Kong cyber infrastructure to remain operational was to not further exacerbate the protests, considering the previously discussed figures of Hong Kong civilians' devices connected to the cellular infrastructure; additionally, the cyber infrastructure provided Hong Kong security forces a method for exploiting the protesters. Therefore, a similarity exists between the coordinators, on an open cyber infrastructure, broadcasting their planned locations for protests to the masses and the Pakistani handlers transmitting, on an open cyber infrastructure, their orders of terror to the Mumbai terrorists. While those in Mumbai used cyberspace communications to disperse information internationally, so did those in Hong Kong use cyberspace for dissemination of information globally. However, mainland China,

[54] Lih, "In Hong Kong's Protests."
[55] Emily Parker, "Social Media and the Hong Kong Protests," *New Yorker*, 1 October 2014, 1.
[56] Lih, "In Hong Kong's Protests."

unlike India, incorporated a form of cyber defense to prevent the dissemination of Hong Kong protesters' messages.

Unlike Hong Kong and India's open cyber infrastructure, mainland China operates the Golden Shield Project, better known as the "Great Firewall."[57] Operated by the Ministry of Public Security, the Great Firewall provides the Chinese government with the ability to censor and survey civilian internet activity, including social media sites such as Facebook, Twitter, and YouTube. Additionally, China blocked Instagram to prevent Hong Kong protesters from sharing images with those on the mainland. Finally, Chinese officials were aggressively censoring Weibo accounts for images and messages related to the Hong Kong protests.[58] However, censorship through the Great Firewall is not the only potential Chinese reaction to the Hong Kong protests.

Since the beginning of the protests, independent media sites in Hong Kong were the victims of the largest cyberattack in history. Coincidentally, the cyberattacks "[increased] in their intensity each time pro-democracy activists announced new activities or developments."[59] Although the Chinese government seemed the primary suspect, a "lone wolf" attack by a single individual operating through a botnet is also plausible.[60] Considering the anonymity cyberspace offers, identifying those responsible for the cyberattack is difficult. It seems more important to focus on how protest sympathizers in China observed censored social media websites, messages, and images through cyberspace. What lessons can we learn from the Mumbai attackers and Hong Kong protesters' cyber counteractions to host-nation reactions?

Cyber Counteractions and Host-Nation Reactions

Considering the lack of cyber reaction to terrorist activities during the Mumbai attacks, additional research did not identify a cyber counteraction by Indian security forces. Of equal importance, the Mumbai

[57] Xiao Qiang, "How China's Internet Police Control Speech on the Internet," Radio Free Asia, 24 November 2008.
[58] Parker, "Social Media and the Hong Kong Protests," 1.
[59] Parmy Olson, "The Largest Cyber Attack in History Has Been Hitting Hong Kong Sites," *Forbes*, 11 November 2014.
[60] Olson, "The Largest Cyber Attack in History."

terrorists had identified known gaps in Indian security forces' cyber capabilities prior to the attack, essentially exposing an Indian gap during mission planning. Those involved in the Mumbai attacks "were well aware of the technology available and also [knew] the police are several steps behind."[61] Again, the use of multiple SIM cards and cellphones, coupled with VOIP services, provided initial anonymity and increased the level of uncertainty and fog of war in Mumbai. Additionally, the Mumbai attackers countered Indian security forces' actions through Pakistani handlers reporting feeds from Twitter and media outlets. The Pakistan-based handlers and Mumbai terrorists' use of the Indian cyber infrastructure facilitated an intelligence, surveillance, and reconnaissance (ISR) enterprise, enabling collection, reporting the actions of Indian security forces, and disseminating information to one another. For example, the terrorist Abu Qahafa used his information-sharing device to access Google to conduct on-the-objective "open source" collection of a hostage, accessing his image on the internet and his posted biography.[62] Similar to the Mumbai terrorists exploiting gaps in Indian cyber capabilities, the Hong Kong protesters exploited capabilities of cyberspace to counter Hong Kong security forces' actions. This may suggest the employment of "cyber intelligence preparation of the battlefield" or "cyber recon" during preoperational planning.

Expecting the cyber infrastructure to shut down, specifically cellular and internet access, Hong Kong protesters incorporated mesh networks for planning, command, control, and communications. A decentralized design, a mesh network, also referred to as off-grid communications, consists of a series of interconnected nodes that talk directly to one another through a cellphone's radio and Bluetooth connection.[63] Provided that users are within a 70-meter radius, the mesh network application FireChat gives access to public chat rooms created by other FireChat users. The Hong Kong protesters, in anticipation

[61] Reich and Gelbstein, *Law, Policy, and Technology*, 396.
[62] Scott-Clark and Levy, *The Siege*, 163.
[63] Suhauna Hussain, "FireChat and Activism," *Berkeley Technology Review*, 23 November 2013.

of a cellular network shutdown and to overcome the strain on the cellular network, created more than 100,000 new FireChat accounts in less than 24 hours for a total of 460,000 in two weeks.[64] Moreover, the protesters developed numerous social media applications to enable the continuation of command and control. For example, these applications claim to leave no user details, such as traceable internet protocol addresses.[65] Hong Kong authorities never censored FireChat or comparable obstreperous web applications, as the main protest-related cyber threat came not from the protesters but from Anonymous.[66]

In support of the Hong Kong protestors, Anonymous, an international hacking syndicate, conducted computer network attacks and exploitation operations against Hong Kong government websites in response to the host-nation security forces' use of tear gas on protesters.[67] As a result of its cyber operations, Anonymous released individual internet protocol addresses (IP addresses) and 50,000 user names and email addresses.[68] This act symbolizes how the globally connected domain of cyberspace interconnects nation-states (Hong Kong), nonstate actors (Anonymous), and civilians (protesters). But how did protesters overcome the Great Firewall?

Despite nation-states' efforts in cyber defense, those capable of identifying and developing techniques will "leap over the firewall" or intrude where desired. In defiance of Chinese censorship, software allows users to access the World Wide Web to "jump the Great Firewall [and check] the BBC News website to scan the top story on Hong Kong protest."[69] For as long as a requirement exists, software, mobile

[64] Sam Judah, "#BBCtrending: Hong Kong's 'Off-grid' Protesters," BBC, 29 September 2014, 2; and Margaret Rouse, "Mesh Network Typology (Mesh Network)," *Internet of Things Agenda* (blog), TechTarget, December 2015.
[65] Michael Sainsbury, "Hong Kong Protesters at Cyberwarfare's Bleeding Edge," *Nikkei Asian Review,* 10 October 2014.
[66] Sainsbury, "Hong Kong Protesters at Cyberwarfare's Bleeding Edge."
[67] Chris Luo, "Anonymous Group of Hackers Release Data from Chinese Government Sites," *South China Morning Post* (Hong Kong), 12 October 2004.
[68] "Anonymous Leaks Chinese Government Website Date over Hong Kong Protests," *Press Trust of India*, 13 October 2014.
[69] Christina Larson, "Not Even China's Great Firewall Can Shut out News about Hong Kong's Democracy Protests," *Bloomberg*, 29 September 2014.

applications, and innovative methods for internet conductivity will continue developing and proliferating.

Findings

The main findings of the 2008 Mumbai terrorist attacks and the 2014 Hong Kong protests identified cyber areas of operations and influence as containing limited value during the conflict. Whether Pakistan-based handlers employing VOIP services routing through the United States and Austria or internationally based nonstate actors conducting computer network attacks and exploitation operations, such as Anonymous, the globally connected domain of cyberspace affords anonymity to the tech savvy. Additionally, the amalgamation of cyberspace's anonymity and global dispersion, coupled with the decreasing cost of information and the increasing capacity to communicate, compounds uncertainty and friction when operating within a megacity environment.

Cellphones are changing the idea of "place." The associated phone numbers in the Mumbai attacks had New Jersey area codes, contributing to the friction. Area codes previously corresponded to a user's general location; now, at best, area codes depict where one purchased a phone or where one's call routed through.[70]

This research and analysis extracted the potential impacts of mobilization and convergence through cyberspace. Protesters and terrorists alike prepared, organized, and concentrated on preplanned locations and targets through the use and benefit of cyberspace. Transient mass connected and mobilized through information-sharing devices, such as the protesters in Hong Kong, swelled from several thousand to 500,000 people, overwhelmed a security force of 30,000, and rapidly focalized on preplanned locations.

The Mumbai attacks and the Hong Kong protests demonstrated nation-states, nonstate actors, and civilians' innovative and simultaneous interaction with one another through cyberspace. In the 2014

[70] Analysis provided by Dr. Eric Shibuya, Marine Corps Command and Staff, Marine Corps University, Quantico, VA, hereafter Shibuya analysis.

Hong Kong protests, the action-reaction-counteraction cycle pitted tech-savvy cyberwarriors in battles on a digital battlefield. This included the introduction, development, and adaptation of new technologies to augment cyber attack protesters' information-sharing devices or to counter potential host-nations' actions.

The cyber actions against Hong Kong and Chinese security forces by Anonymous demonstrate that third-party actors, to include nonstate actors, can support a nation-state's adversary. Third-party actors, potentially operating globally from unknown locations, can conduct computer network attacks and exploitation operations against either side participating in conflict.[71]

A megacity, with its densely connected population, allows for better coordination and generation of transient mass. As the Hong Kong protests indicate, one social media post or text message can quickly assemble a massive "army" on an unsuspecting security force.

It is unlikely that host-nations will terminate the conductivity between the population of a megacity and cyberspace since doing so potentially increases host-nation uncertainty. This was evident in Hong Kong and Indian security forces' decision to maintain the availability of cyberspace. Additionally, terminating access to cyberspace to limit the formation of transient mass appears futile, considering the availability of technologies (e.g., satellite communications and WhatsApp) to connect information-sharing devices without internet or cellular network access.

CASE STUDY CONCLUSION

Modern technologies provided both the Hong Kong protesters and Mumbai terrorists a low-cost, effective medium to mobilize and converge preplanned locations and targets. As a result, host-nation security forces encountered unprecedented levels of uncertainty and friction, including an initial unknown number of attackers, an inability to thwart protests, and an inability to coordinate an immediate, effective security response. Although the cyberfog blinded Indian security

[71] Shibuya analysis.

forces' ability to locate the Pakistan-based handlers, cyberspace did yield immediate tactical and operational-level intelligence. Likewise, the Hong Kong protesters' cyber-enabled levée en masse caught an unsuspecting security force off-guard, thereby increasing uncertainty and operational friction. Yet, cyberspace provided Hong Kong security forces a medium to gain situational awareness. As challenging as these events were to Indian and Hong Kong security forces, potential concepts emerged that could benefit the U.S. military.

American forces must conceptualize exploiting transient mass's inherent electromagnetic energy. In doing so, tactics, techniques, and procedures will overcome mobilization and convergence through cyberspace in the megacity. Finally, any concept exploiting transient mass's electromagnetic energy must consider any associated authorities to assist a maneuver commander in seeing through the cyberfog.

Purpose of the Military Concept

Within the megacity, transient mass uses information-sharing devices to command, control, and communicate. Consequently, the electromagnetic energy emanating from a transient mass's information-sharing devices is exploitable. The purpose of this concept is to provide a maneuver commander the ability to capitalize on the megacity's inherent electromagnetic energy in support of military operations.[72] In Iraq and Afghanistan, adversaries effectively utilized the electromagnetic spectrum to conduct command, control, computer, communication, intelligence, surveillance, and reconnaissance (C4ISR) as well as detonate explosive devices. Hard lessons learned from these wars resulted in the rapid development of electronic warfare systems, such as the U.S. Marine Corps Systems Command's Thor III system, to counter an adversary's use of the electromagnetic spectrum.[73] These systems, intended for defensive and reactive employment, seek to jam versus exploit electromagnetic space for maneuver and ISR. As the

[72] Christopher A. Kennedy et al., "Energy and Material Flows of Megacities," *Proceedings of the National Academy of Sciences* 112, no. 19 (April 2015): https://doi.org/10.1073/pnas.1504315112.

[73] *Concepts and Programs 2011* (Washington, DC: Headquarters Marine Corps, 2012), 286.

U.S. military retrogrades out of the mountains and valleys of Afghanistan and potentially into the skyscrapers and alleys of a megacity, an adversary's use of the electromagnetic spectrum not only continues, but also compounds. Within the megacity, characterized by its information-sharing device, network-connected population, the adversary adds the ability to organize transient mass to their arsenal, facilitating mobilization and convergence onto military friendly locations. This concept proposes using a transient mass's organic electromagnetic energy and information-sharing devices to increase a maneuver commander's situational awareness and an adversary's cognitive load through cluster logic and misinformation, respectively. Cluster logic refers to the use of a transient mass's electromagnetic signature to ascertain its size, direction, and speed. Accordingly, cluster logic and misinformation arm a maneuver commander with the ability to disrupt transient mass's capacity to mobilize and converge, decrease the uncertainty caused by the transient mass, and allow an increase in situational awareness. Cluster logic and misinformation allow a maneuver commander to see through the fog.

Time Horizon, Assumptions, and Risks

In *The Megacity: Operational Challenges for Force 2025 and Beyond*, the Army Chief of Staff examines how "military forces might conduct operations in and around a megacity and approaches to achieve military success in urban environment in 2030–2040."[74] As one of the nation's 911 forces in readiness, the 3d Marine Division staff frames the complexities of a megacity in anticipation of future contingencies.[75] The amalgamation of the U.S. military's anticipated megacity operations and examples of other nations' security forces operating within a megacity demonstrate the near-term requirement for capabilities that take advantage of a megacity's inherent electromagnetic energy. However, this concept implies two assumptions for its utilization.

[74] *The Megacity: Operational Challenges for Force 2025 and Beyond* (Washington, DC: Army Chief of Staff, Department of the Army, 2014), 1.
[75] 3d Marine Expeditionary Force email to Marine Corps Command and Staff, 14 October 2014.

First, this concept assumes the replication of policies, procedures, and authorities similar to that of the electronic warfare systems employed in Iraq and Afghanistan. The concept is a force multiplier to a maneuver force commander, regardless of the military occupational specialties of subordinate units. The second assumption signifies that transient mass is dependent on information-sharing devices for command, control, and communication. Although the proliferation of information-sharing devices is evident within a megacity, there are associated risks that will prevent employing this concept.

One associated risk is that transient mass within a megacity is not dependent on information-sharing devices or nonelectromagnetic energy for command and control, but paper-based communication. Using newspapers and leaflets, similar to the Napoleonic fervor expressed though paper-based printed documents, requires a less technological response. Arguably, a host-nation terminating the use of the telecommunications infrastructure to its citizens posits additional risk; however, not only does this seem unlikely, but applications exist to allow information-sharing devices to work despite the lack of infrastructure.

Description of the Military Problem

Modern technologies provide transient mass a low-cost, effective medium to rapidly mobilize and converge at preplanned locations and targets. As a result, the U.S. military will encounter unprecedented levels of uncertainty and friction, including an unknown number of adversaries; an inability to disrupt, defeat, or deny an adversary the ability to mobilize and converge; and an inability to coordinate an immediate, effective response. This concept provides a maneuver commander with the ability to turn transient mass's command and control mechanism on itself and to use transient mass's electromagnetic signature as a radar. Flooding an adversary's command and control mechanism with misinformation makes ascertaining the correct orders and directions from a transient mass's leadership challenging while increasing an adversary's uncertainty and friction. Additionally, by sensing and graphically presenting the transient mass's energy, a maneuver commander generates situational awareness; yet, to best understand this concept requires context of potential security environments.

A potential security environment is 3d Marine Expeditionary Brigade or a Special Purpose Marine Air-Ground Task Force–Crisis Response (SPMAGTF-CR) supporting either humanitarian assistance/disaster relief or embassy reinforcement operations in a megacity encountering civil unrest or unstable peace.[76] Exacerbating each scenario is the use of low-cost, effective information-sharing devices to mobilize and converge at American military locations, such as aid relief stations, staging locations, and the U.S. embassies. To prevent further escalating the internal unrest, the host-nation ostensibly decides not to power down its communication infrastructure, such as internet connectivity. Commonly organic to each Marine Air-Ground Task Force (MAGTF), the maneuver commander's intelligence section provides threat assessments and conducts force protection and indication and warning operations. Nonetheless, the intelligence section's ability to accurately report the formation, location, and direction of transient mass is limited due to placement and access of organic collection assets. Consequently, the servicemember on post requires the most current information to prevent the mobilization and convergence of transient mass on that position. Furthermore, the maneuver commander requires a capability to affect transient mass through nonlethal fires.

Synopsis of Central Ideas

This concept has two subcomponents. The first subcomponent provides for the ability to turn the transient mass's command and control on itself by exponentially increasing the amount of misinformation the adversary must siphon, similar to increasing the noise in signal-to-noise ratio. The desired end state with transient mass is to cause disorganization within the transient mass. By increasing the interference (the volume of misinformation that transient mass

[76] *Unstable peace* refers to "a situation in which tension and suspicion among parties run high, but violence is either absent or only sporadic." Education and Training Center, Certificate Course in Conflict Analysis (Washington, DC: United States Institute of Peace. 2015); and Joseph I. Farina, "Challenges to Yemen's Sovereignty" (unpublished paper, Marine Corps University, 9 February 2015), 6.

must filter), the desired signal (relevant information, such as locations of U.S. forces or planned protest sites) becomes difficult to discern. This subcomponent is comparable to cognitive load theory.[77]

Cognitive load theory literature determines "that subjects under a larger cognitive load tend to be more impulsive and less analytical" and are "less able to devote cognitive resources to reflect on their decision," leading to impulsiveness, being more risk averse, exhibiting a higher degree of impatience, and failing to process all available information.[78] Cognitive load "manipulation is effective because it occupies a portion of the working memory of a subject" and is similar to the diminished ability to reason.[79] Accordingly, presenting vast amounts of misinformation (interference), or increasing the cognitive load, increases uncertainty and friction on transient mass. This subcomponent increases the "noise" by flooding command and control mediums with misinformation, including false locations and directives from organizers.

The second subcomponent is cluster logic. Akin to the local news providing a layered geospatial presentation warning about a thunderstorm 10 miles in diameter and moving at 35 miles per hour, cluster logic reports the size, location, direction, and speed of transient mass to maneuver commanders and subordinate units. Cluster logic in this situation uses transient mass's electromagnetic signature as radar by graphically representing the information on the user's graphic user interface (e.g., Google Earth's KML feeds or overlays), comparable to the "hot spots" of thunderstorms.[80] Note that users can employ each concept individually or in a mutually supporting fashion. The net result

[77] *Cognitive load* refers to an instructional theory that starts from the idea that working memory is limited by the amount of information it can hold and the number of operations it can perform on that information. See John Sweller et al., *Cognitive Load Theory* (New York: Springer, 2011).

[78] Sean Duffy and John Smith, "Cognitive Load in the Multi-Player Prisoner's Dilemma Game: Are There Brains in Games?," *Journal of Behavioral and Experimental Economics*, no. 51 (August 2014): 48, https://doi.org/10.1016/j.socec.2014.01.006.

[79] Duffy and Smith, "Cognitive Load in the Multi-Player Prisoner's Dilemma Game," 48.

[80] KML refers to Google Keyhole Markup Language or "a file format used to display geographic data in an Earth browser such as Google Earth, Google Maps, and Google Maps for mobile." See "KML Tutorial," Developers Google, 16 November 2017.

of collapsing transient mass through cognitive load and cluster logic is the ability for a maneuver commander to deny, degrade, and defeat transient mass.

Application and Integration of Military Functions

The Marine Corps' view of command and control accounts for "the implications of the ongoing information explosion that is a consequence of modern technology" as factors when forming an understanding of the nature of war and the Marine Corps' philosophy on warfare.[81] Although not war necessarily, megacity operations operate under this philosophy regardless. The proposed concept supports command and control by identifying a transient mass's location, direction, and speed, thereby facilitating the U.S. military forces' perseverance in spite of uncertainty. This concept aids a commander in not only seeing the problem through cluster logic, but also by synthesizing this information with intelligence reporting. They can then communicate the synthesized information to subordinate and host-nation forces for force protection and directing maneuvering units to disrupt, defeat, or deny the adversary or reinforce already employed forces. Additionally, this concept may force the adversary to another medium, potentially exposing additional nodes in the network or previously unknown methods of command and control, contributing to situational awareness and the targeting cycle. Finally, cluster logic users, through the MAGTF Cyberspace and Electronic Warfare Coordination Cell (CEWCC), can identify targets where nonlethal fires, such as electronic warfare and cyberspace operations, are required to increase the noise (cognitive load) on transient mass.[82] Pointedly, this concept enables the warfighting functions to increase a transient mass's friction and uncertainty and to facilitate friendly command

[81] *Command and Control*, Marine Corps Doctrinal Publication (MCDP) 6 (Washington, DC: Headquarters Marine Corps, 1996), 2–3.

[82] The CEWCC "coordinates the integrated planning, execution, and assessment of cyberspace and EMS actions across the MAGTF's operational environment in order to increase operational tempo and achieve military advantage." See "MAGTF Cyberspace and Electronic Warfare Coordination Cell (CEWCC) Concept," Marines.mil, 24 July 2014.

and control, maneuver, force protection, intelligence fusion, and nonlethal fires. However, there are fundamental capabilities required to implement this concept.

Necessary Capabilities

This concept should not fixate on ground employment only. Considering that the MAGTF is task organized, rotary- and fixed-wing employment should be explored. Not only does this offer flexibility but also line-of-sight, placement, and access considerations. Aviation examples include roll-on/roll-off capabilities for MAGTF rotary-wing assets, the Navy's EP-3E ARIES II fixed wing assets, and small tactical unmanned aircraft systems.[83] Additionally, considering force "footprint," where high-demand/low-density military occupational specialties are limited or not authorized for in-country clearance, maneuver units must have access to this capability.

Spatial and Temporal Dimensions

Obtaining this level of electromagnetic situational awareness through cluster logic potentially provides users a faster rate of information compared to traditional indications and warning reporting. Eliminating the broadcast and dissemination of traditional reporting and replacing it with near real-time capability, as this concept proposes, increases the user's observe-orient-decide-act (OODA loop) cycle, leading to a faster operational tempo. Coupling both concepts, similar to combined arms, further expedites a maneuver commander's operational tempo by increasing the adversary's uncertainty and friction, thereby decreasing the adversary's OODA loop cycle.[84] There are no prescriptive actions or methods for the employment of these concepts. However, information reconnaissance and preparation of the environment, occurring during phase 0 (shape environment) operations, provides users an advanced understanding of their electromagnetic environment, including potential locations for operational "stand-off"

[83] ARIES refers to airborne reconnaissance integrated electronic system.
[84] *Warfighting*, MCDP 1 (Washington, DC: Headquarters Marine Corps, 1997), 40, 102.

and optimization of equipment. This provides users time and space to conduct operations and maneuver to deny, disrupt, or defeat transient mass. As a general scheme of maneuver, operations should consist of surveying, synthesizing survey information with maneuver concept of operations, determining operational site (e.g., checkpoint, staging area, aid station, host-nation facility) locations, and running conductivity checks. On employment of the operational element, the commander's tactical operations center would not only graphically display team locations but cluster logic system data feeds as well.

CONCLUSION

Applying the military lexicon of areas of responsibility, influence, and interest to cyberspace are of limited utility due to the anonymity and global reach cyberspace offers its users. As U.S. military planners forecast megacity operations, cyberspace only compounds the uncertainty and friction a maneuver commander encounters. Cyberspace within the megacity allows nation-states and nonstate actors to use transient mass for mobilization and convergence on a technologically superior adversary, thereby creating a denser fog of war and adding friction to an adversary's operations. Additionally, within the megacity characterized by its information-sharing device network-connected population, the adversary adds the ability to organize transient mass to their arsenal, facilitating mobilization and convergence onto military friendly locations. However, this does not mean U.S. military forces are helpless.

The cluster logic and cognitive load concept proposes using a transient mass's organic electromagnetic energy and information-sharing devices to increase a maneuver commander's situational awareness and an adversary's cognitive load through misinformation. The ancient Chinese military general, Sun Tzu, reinforces the concept of using an enemy's inherent capabilities in *The Art of War*. He states that "the opportunity to secure ourselves against defeat lies in our own hands, but the opportunity of defeating the enemy

is provided by the enemy himself."[85] Therefore, an adversary operating within the megacity, interconnecting through cyberspace and using transient mass to mobilize and converge on preplanned locations, may actually provide a maneuver commander the ability to see through the cyber fog.

[85] Sun Tzu, *The Art of War*, trans. Samuel B. Griffith (New York: Oxford University Press, 1963), chapter 4.

CHAPTER NINE

Take It, Don't Break It

A Megacity Concept of Operations

Colleen Borley
Foreign Service Officer, Department of State

Even though siege warfare predates medieval times, examples can be seen today in the actions of dictatorial leaders in such countries as Syria or the American military's attempts to take Mosul. Syrian president Bashar al-Assad has retaken more than 75 percent of Aleppo with the passing of time and a great deal of support from his close ally, Russia. Even against heavy artillery and indiscriminate air strikes, under-equipped rebels have been able to hold large swaths of compact urban cities. Today, sieges are more sophisticated and involve strangling a population of available resources and information, which causes tremendous loss and crisis in the enemy nation-state.

MEGACITY MOJO

Any parent entering the china section of Macy's with a three-year-old understands the concept of "you break it, you buy it." All but the stout-of-heart parent would steer the toddler clear of the china section altogether. Today, the United States has learned that the world expects America to fix what it broke in the aftermath of a conflict. As a result, the megacity has become a "steer clear" zone in U.S. Army doctrine.

Just as with the complexities of keeping a toddler out of trouble in Macy's, the Army grasps the difficulties of tackling war in the megacity. Former secretary of state and Army general Colin L. Powell acknowledged the expectation in deliberations over the war in Iraq in 2002 with President George W. Bush, according to the *Washington Post*'s Bob Woodward, who called it the "Pottery Barn Rule."[1] The expectation that the United States will fix what it broke makes preparations for the end of a conflict essential throughout the prosecution of the conflict. Fortunately, war is less likely to occur within a megacity given the urban environment's economic dynamism. However, if external forces thrust war upon the megacity, victory will require the preservation of its dynamic and intricate networks. A look at the megacity's intricacies shows its economic power. A case study on sieges indicates that the best way to preserve the economy and the megacity's networks is to win without fighting, or a broader concept for victory in a megacity without substantially breaking it. Victory without butchery means employing deception, gaining support from inside, and preventing the enemy from using tunnels.

The megacity is not one of the "nine terrains" Sun Tzu envisioned, but if he were alive today, Sun Tzu would have to revise his terrains to include the megacity. The world's population is growing increasingly urbanized and more megacities are emerging. Megacities present a multidimensional battlespace inhabited increasingly by netizens linked through complex digital relationships.[2] Megacities frequently stretch high into the sky, dense with towers, while containing depths of an almost equal size below ground in a warren of tunnels. Slums and periurban areas are also a characteristic of megacities.[3] How do you fight and win in this complex territory? Given the amount of wealth generated in megacities and their importance to the global

[1] Bob Woodward, *Plan of Attack* (New York: Simon & Schuster, 2004), 150.

[2] For the purposes of this discussion, *netizen* refers to an active participant in the online community of the internet.

[3] *Periurban* refers to areas that are largely defined as those surrounding metropolitan areas and cities, though neither urban nor rural in the conventional sense. They are often contested spaces and largely regarded as being in transition.

economy, the challenge to success in a megacity is to take it without substantially breaking it. Key terrain becomes network nodes for food, water, communications, and electricity. Seizing key terrain generally means laying siege to the city.

The growth of urban poverty associated with a megacity seems to drive doom and gloom analysis about the future of warfare. Economic data suggests a different view, however, and there is room for optimism. Megacities cluster cheap labor, deliver public goods and services efficiently, generate significant portions of national wealth, and provide opportunity for advancement. The data shows the economic power of the megacity and explains why people migrate to them. The megacity's economic power and resiliency will likely insulate the megacity from warfare in the future.[4]

Pessimism seems to dominate literature on urbanization and megacities. A leading figure in this camp seems to be Australian writer David Kilcullen. In *Out of the Mountains*, Kilcullen argues that population growth, urbanization, littoralization, and connectedness are factors that will play a role in the causes of wars of the future. He deduces that population growth and concentration in urban centers such as megacities will cause wars, because war is a fundamental human endeavor. Where humans are, Kilcullen predicts, war will follow. He reaches a logical conclusion, but data does not seem to support the conclusion, and his conclusion falls short on understanding urbanization and the growth of megacities.[5]

Jonathan Kalan, Janice Perlman, and Edward Glaeser have studied megacities and identified causes for optimism. Kalan, a photojournalist who writes for the BBC and *Foreign Policy*, takes on the traditional notions of the megacity's ills. Where some see slums, Kalan argues there is dynamic economic activity and upward mobility. Where some see environmental catastrophe, Kalan suggests that the average megacity dweller uses less energy and emits less than their

[4] Jeff Desjardins, "The Megacity Economy: How Seven Types of Global Cities Stack Up," *Visual Capitalist*, 7 February 2017.
[5] David Kilcullen, *Out of the Mountains: The Coming Age of the Urban Guerrilla* (New York: Oxford University Press, 2013).

rural counterpart.[6] Janice Perlman is a sociologist, who spent 40 years studying the favelas of Rio de Janeiro, Brazil. Her research documents the upward mobility of the megacity's slums and demonstrates why people continue to migrate toward megacities.[7] Harvard economist Edward Glaeser proposes that slums are a sign of a healthy city, because they are the first step on the urban ladder to prosperity. He notes that cities do not make people poor, but poor people flock to cities because of the economic opportunity they provide.[8] Looking at Detroit, the inverse seems true. When a city can no longer provide prosperity, people abandon it.

Three key assumptions underlie the analysis of probable warfare in a megacity. The first is that a fundamental cause of war is economic. The second is that the most important difference between a city and a megacity is their scale. The third is that the phrase "war in a megacity" refers to urban combat, such as the conditions the U.S. military experienced in Fallujah, Iraq. A single violent act or terrorist attack do not constitute war but could be the precursors to war. Graham Brown and Arnim Langer, scholars of hybrid inequalities, note that "empirical evidence suggests that the progress of a country's economy and the likelihood of violent conflict tend to be inversely related . . . [since] violent group mobilization frequently occurs in situations characterized by a sharp economic decline or lower-than-expected economic progress."[9] Indermit Gill of the World Bank's Development Economics unit emphasized scale in differentiating megacities from cities.[10] If megacities are prosperity generators on a massive scale, then it would seem that war would be less likely.

Megacities attract millions each month and aggregate their

[6] Jonathan Kalan, "Think Again: Megacities," *Foreign Policy*, no. 206 (May–June 2014): 69.
[7] Janice Perlman, *Favela: Four Decades of Living on the Edge in Rio de Janeiro*, Kindle ed. (New York: Oxford University Press, 2010).
[8] Edward Glaeser, *Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier*, Kindle ed. (New York: Penguin Books, 2011).
[9] Graham K. Brown and Arnim Langer, "Horizontal Inequalities and Conflict: A Critical Review and Research Agenda," *Conflict, Security & Development* 10, no. 1 (2010): 27, https://doi.org/10.1080/14678800903553837.
[10] Kalan, "Think Again," 70.

cheap labor into economic success. Nearly 1.4 million individuals per week migrate to cities globally.[11] If people are rational actors making choices about their future, then clearly they see taking a chance on the cities as beneficial, even if it means trading the countryside for the slum. Mega-naysayers such as Kilcullen predict a "human tidal wave" as a coming catastrophe, but since 1950, the cities of the globe have absorbed the equivalent of New York City's population every other month.[12] Despite this huge influx, the city continues to deliver on its economic promise to many. Not only do people migrate to cities and eventually improve their economic situation, they generate enough wealth to send it back to their relatives. According to the World Bank, "In 2013, remittances were more than three times larger than [official development assistance] ODA and, excluding China, significantly exceeded foreign direct investment flows to developing countries."[13] The human migration toward the megacities and the remittances demonstrate the economic success of the megacities. Additionally, the migration and remittance flows link megacities and rural regions closely together, so it is possible that an economic shock in one could be felt in another. The megacity's economic success and increasing global ties are two factors that will insulate the megacity from the prospect of warfare.

Upward mobility for the urban poor and migrants of a megacity is another key factor in the diminished likelihood of war in a megacity. Janice Perlman, who experienced Rio's favelas firsthand, makes an important distinction about urban migrants. She observed that these newcomers were the "most far sighted, capable, and courageous members of their communities. They were the ones with the motivation and willingness to work in the least desirable jobs for the longest hours . . . to provide their children with the opportunities they

[11] Karen C. Seto and Shobhakar Dhakal, "Human Settlements, Infrastructure, and Spatial Planning," in *Climate Change 2014: Mitigation of Climate Change*, ed. Ottmar Edenhofer et al. (Cambridge, UK: Cambridge University Press, 2014).
[12] Perlman, *Favela*.
[13] Dilip Ratha et al., *Migration and Development Brief*, no. 23 (Washington, DC: World Bank, 2014), 1.

never had."[14] The United Nations' Population Fund reports that cities concentrate poverty, but they also provide opportunities to escape poverty.[15] Perlman followed residents of the favelas for many years and found that 67 percent of her original subjects, as well as 65 percent of their progeny, had left the slums. Those subjects who stayed in the favelas noted they had better access to public services and improved household comforts.[16] As long as the megacity continues to churn economically and maintain the prospect of upward mobility for many of its residents, it seems unlikely that war will germinate amid the trickle-down prosperity.

Research suggests that megacities perform more efficiently and with less environmental impact in the delivery of goods and services than rural areas. A 2012 McKinsey Global Institute study found that it was 30–50 percent cheaper to provide housing, water, and education in populated urban areas than in rural areas. The study also found that 90 percent of urban households had electricity as opposed to 63 percent of rural households.[17] Edward Glaeser argues that the average city dweller uses less energy than their country or suburban counterpart.[18] In Glaeser's view, "The combination of public transportation, smaller homes, higher population density and neighborhoods designed for walking makes cities the most environmentally friendly places for living."[19] Similar to the argument about upward mobility, as long as the megacity continues to deliver the "public goods," war seems less likely to loom in future.

The flow of more than a million people per week, and the subsequent upward mobility, seems to confirm what the financial data shows. The megacity is a powerhouse of wealth generation. The McKinsey study found the 600 cities making the largest contribu-

[14] Perlman, *Favela*, 216–21.
[15] *Population, Environment and Poverty Linkages: Operational Challenges* (New York: United Nations Population Fund, 2014).
[16] Kalan, "Think Again," 71.
[17] Richard Dobbs et al., *Urban World: Cities and the Rise of the Consuming Class,* Kindle ed. (New York: McKinsey Global Institute, 2012).
[18] Ethan Wagner, "Review: Two Tales of a City," *Journal of International Affairs* 65, no. 2 (Spring/Summer 2012): 189–91.
[19] Wagner, "Review: Two Tales of a City."

tion to global gross domestic product (GDP) would have created 65 percent of global economic growth by 2025. Of those 600, 440 cities are in emerging economies. By 2025, those 440 cities will have generated close to half of global GDP growth.[20] The Asian Development Bank (ADB) found that cities in Asia produce more than 80 percent of GDP in many Asian countries. According to ADB, almost 80 percent of metropolitan areas in the world have average incomes that exceed those for their nations, particularly in Asia.[21] The other ramification of megacity wealth generation is that the destruction of or disruption to the megacity is not in anyone's best interest. For countries depending on the megacities to drive their national economy, violence in the city disrupting the economy and the flow of goods and services assures a destructive situation.

War is not likely to take place in megacities, because they are efficient and dynamic aggregators of economic wealth, distributors of goods and services, and mechanisms for upward mobility. That does not mean that the megacity will be able to provide everything to all its inhabitants. Nor does it mean that violence, crime, and slums will not exist in megacities or that megacities are invincible. Possible causes for disrupting the success of megacities may come instead from state failure or interstate conflict. Yet, it seems the megacity contains sufficient resilience and economic capacity to prevent such shocks from completely disrupting the megacity.

In the event that state failure or interstate conflict bring war to the megacity, it seems logical that the conflict could take shape as a siege. In the past, warring parties could bypass, occupy, besiege, or destroy enemy-held cities. Of the four options for dealing with such a city, one of the most complex military options is the siege. The density and territorial expanse of a megacity magnify the military challenge the megacity poses. Examining methods of ending sieges offers many lessons, which could apply to the megacity. Several ways to end a siege appear common: treachery, deception, tunnels, surrender, and

[20] Dobbs et al., *Urban World*, 25.
[21] "ADB's Focus on Urban Development," Asian Development Bank, accessed 13 November 2014.

negotiated settlement. For our purposes, we will leave surrender and negotiated settlements to the diplomats and politicians. Treachery, deception, and tunnels seem the most applicable to the military practitioner because opposing forces have used them all in sieges to compel an enemy to surrender or to resist an enemy's blockade.

Siege Case Studies

A case study of 19 sieges on four continents across 2,000 years of history does not chronicle siege technology, but rather the people on both sides of the walls (table 1). The case study shows how they overcame their respective impasses using deception, treachery, and tunnels. Case selection included geographic considerations to observe global siege conditions. Methodology for siege breaking also factored into the case selection as well as the availability of sufficient information documenting the use of deception, treachery, or tunnels. The most common conclusion for a siege is that one of the parties simply capitulates once reaching the end of its ability to resist. The cases where resistance succeeded or deception brought swift victory are of greatest interest to this study. The significance today of sieges is that, as the number of megacities grows, twenty-first-century conflict is likely to take place in or around a megacity. The key to victory in a megacity may lie beyond the Trojans and the trebuchet in understanding the siege as a complex military option for approaching conflict in a megacity.

Medieval walled cities and megacities bear some comparisons worth exploring. A megacity is an urban population center containing more than 10 million inhabitants characterized by vast geographic area and dense concentrations of people and infrastructure.[22] Megacities draw strength from generating enormous amounts of economic activity and the resiliency derived from the interconnectivity of the cities' inhabitants.[23] At the same time, megacities remain vulnerable because the inhabitants depend on water and produce grown outside

[22] Kalan, "Think Again," 69.
[23] David J. Kilcullen, "The City as a System: Future Conflict and Urban Resilience," *Fletcher Forum of World Affairs* 36, no. 2 (Summer 2012): 20.

Table 1. Case study of historical sieges

	Treachery	Deception	Tunnels	Negotiate	Key to success
Damascus, 634	X				Insider threat; traitor told of opportune time to conduct attack on the walls
Rome, 408				X	Senators bought their way to the end of the siege
Masada, 73					Brute force; Romans took the city
Damascus, 1148	X				Insider threat; traitor informed of weakness to city
Detroit, 1812		X			Psychological operations; size of attacking force and Native American contingent
Mafeking, 1899–1900		X			Psychological operations; conditions within the walls and commitment to resist
Smolensk 1609–10	X				Insider threat; traitor revealed weakness in walls that attackers exploited. The siege ended that same day
Batavia, 1629	X				Dutch burned rice barns and logistics through spies
Petersburg, VA, 1864–65			X		Tunnel built under Confederate lines
Ypres (Passchendaele), 1917			X		Tunnel under Hill 60 hit with largest explosion of its kind
Alamo, TX, 1836					Caused the Texans to sleep then killed the sentinels
Turin, 1706			X		Tunnels allowed for efficient use of military equipment; defenders could hold out until help arrived
Gaza, 332		X	X		Used for life support, weapons caches, troop movements

Metz, 1870	X				Insider threat; traitor provided time to attack
Shimabara, 1672		X			Ninjas obtained uniforms, snuck in, and broke the siege
Smolensk, 1706	X		X		Insider threat; traitor provided information on wall weakness and invaders breached the wall with explosives

Source: Compiled by author

of the city for sustenance. Not unlike the walled cities of the past, the density of the megacity makes visibility into the heart of the city difficult for an enemy. In addition, megacities must import the elements of sustainment, food, and water just as their medieval urban forebearers did. The need to sustain life through resources brought into the city makes both a walled city and a megacity vulnerable to sieges.

For the purposes of our discussion, a *siege* refers to a "military operation in which enemy forces surround a town or building, cutting off essential supplies, with the aim of compelling the surrender of those inside."[24] The term *siege* is different from the term *blockade* in that the purpose of a siege is to compel surrender by denying the enemy life-sustaining materials. In contrast, a blockade by definition does not have a stated purpose other than denying the import of sustainment. According to Merriam-Webster, a blockade serves "to stop people or supplies from entering or leaving (a port or country) especially during a war."[25] The Army's *Operational Terms and Graphics* omits a definition of both words, but both remain viable military means to achieve objectives today. The task to isolate is listed as "a tactical mission task that requires a unit to seal off—both physically and psychologically—an enemy from his sources of support, deny him freedom of movement, and prevent him from having contact with

[24] "Siege," Oxford Dictionaries.
[25] *Merriam-Webster's Collegiate Dictionary*, 11th ed. (Springfield, MA: Merriam-Webster, 2003).

other enemy forces."[26] None of these definitions includes walls as a requirement. The key element in sieges is compelling the enemy to act and the enemy's resistance to that compulsion. For nearly 2,000 years, both the attackers and defenders in sieges have used treachery, deception, and tunnels to compel enemy action and achieve victory.

For the purposes of the case study, *treachery* refers to the provision of privileged information provided from inside sources, which allows an opposing force to achieve foreknowledge in support of victory. Information derived from treachery can either provide insight into enemy centers of gravity, critical vulnerabilities, or preconceptions. According to Abram Shulsky, the former director of the Office of Special Plans at the Department of Defense, "deception refers to the effort to cause an adversary to believe something that is not true . . . with the goal of leading him to react in a way that serves one's own interests, rather than his." A 1980 study from the Office of Research and Development at the Central Intelligence Agency divides deception into two types. A-deception involves increasing the enemy's ambiguity by diluting the truth's signal strength and increasing the possible number of alternate explanations.[27] M-deception uses misdirection where alternate explanations are limited to those false conclusions the enemy is intended to draw in accordance with a plan.[28] Whether A-deception or M-deception, feedback that the enemy is interpreting signals as intended improves the overall success of any deception operation.[29] Privileged information from the inside is one key feedback mechanism.

In some cases, betrayal from an insider represents an efficient path to victory. In 634 CE, General Khalid ibn al-Walid laid siege to Roman-controlled Damascus. A resident of Damascus seeking refuge for his bride informed al-Walid that the city planned to mark the birth of

[26] *Operational Terms and Graphics*, FM 101-5-1 (Washington, DC: Department of the Army, 1997), 1–105.
[27] *Deception Maxims: Fact and Folklore* (Washington, DC: Office of Research and Development, Central Intelligence Agency, 1981), 22.
[28] *Deception Maxims*, 22.
[29] Abram Shulsky, "Elements of Strategic Denial and Deception," *Trends in Organized Crime* 6, no. 1 (September 2000): 17, https://doi.org/10.1007/s12117-000-1003-1.

the Roman governor's son with a celebration. Additionally, the Roman informant told the general that the inhabitants of the city would be drunk and the walls lightly defended. Al-Walid selected a few men to scale the walls, open a gate, and allow the army to enter.[30] Privileged information provided visibility into the activities within the walls, and allowed General al-Walid to take advantage of an operational opportunity. Operations in a megacity will similarly require insider information to overcome the density of the megacity and inform operational decisions.

As with Damascus, insider information proved decisive in the siege of Smolensk. Lithuanian forces besieged Russian-controlled Smolensk from 1609 to 1611. Lithuanian forces finally broke through when an informant, Andrei Dedishin, told Lithuanian forces the location of the city wall's vulnerability.[31] Lithuanian forces dug under the wall and placed a powder charge underneath the wall to punch a hole and provide an avenue for attack. The city fell by the next day following the wall's breach.[32] Once again, an insider provided critical information to the enemy's understanding of critical vulnerabilities and played a decisive role in ending the siege.

In Metz, France, during the Franco-Prussian War, Wilhelm Stieber, Otto von Bismark's head of the Feldgendarmerie, employed an extensive network of sources.[33] Stieber had a source in French marshal Patrice de MacMahon's staff who reported the French plans to relieve its forces under siege at Metz.[34] Prussian general Helmuth von Moltke used the source's report to outmaneuver the French relief force and trap them in the fortress of Sedan, including Emperor Napoleon Bonaparte III. Not only did the source's information compel the surrender

[30] Terry Crowdy, *The Enemy Within: A History of Spies, Spymasters, and Espionage,* Kindle edition (Oxford, UK: Osprey Publishing, 2006), 794–97.
[31] Daniel H. Shubin, *Tsars and Imposters: Russia's Time of Troubles* (New York: Algora Publishing, 2009), 200.
[32] Anna Filipczak-Kocur, "The Regaining of Smolensk in 1611 and Its Defence in 1634 in the Eyes of Contemporary Lithuanian Prints," *Cross-Cultural Communication* 10, no. 3 (2014): 2.
[33] Crowdy, *The Enemy Within*, 3,414–17.
[34] Crowdy, *The Enemy Within*.

of Metz and Sedan, it ended the war by crushing the French Army's ability to resist.

Deception changes risk gain calculations, often allowing one side to persist until reinforcements arrive or convincing a side that continued resistance is futile. In 1899, British colonel Robert Baden-Powell and a garrison of 1,500 men withstood a siege by 8,000 Boers for 217 days at Mafeking, South Africa.[35] Colonel Baden-Powell and his men employed a variety of deceptive tactics to buy time until reinforcements could break the siege.[36] For example, Colonel Baden-Powell's men placed dummies on the fortifications to draw fire from Boer positions, offering British snipers a chance to attrite the Boer force. When Boers grew skeptical of the dummies, the British played accordion music as the dummies made their appearance on the fortifications.[37] Colonel Baden-Powell also cobbled together improvised dummy forts, guns, and armored trains to draw enemy fire.[38] The British would also "fatten-up" any emissaries sent to consider terms with the Boers during the siege to give the appearance that conditions in the fort remained tenable for a significant period.[39] The colonel also arranged Sunday cricket matches to aid the impression that all was well within the walls and the British could hold out indefinitely.[40] Colonel Baden-Powell's ruses bought sufficient time for British reinforcements to raise the siege. In the case of Mafeking, deception served as a force multiplier and allowed the British sufficient time to reinforce their position and lift the siege.

The British success at Mafeking illustrates not only how deception can change the risk gain calculation but also how deception conditions the enemy through repeated actions and small changes. The British representative's appearance and attitude conditioned the

[35] Christopher Dawson, "The Celebrated Siege," *Daily Telegraph* (Sydney, Australia), 17 May 2000.
[36] John Fox, "Lord Robert Baden-Powell (1857–1941)," *Prospects* 43, no. 2 (2013): 255, https://doi.org/10.1007/s11125-013-9265-y.
[37] Reginald Hargreaves, "For to Deceive," *Marine Corps Gazette* 43, no. 1 (January 1959).
[38] Dawson, "The Celebrated Siege."
[39] Hargreaves, "For to Deceive."
[40] Dawson, "The Celebrated Siege."

Boers with whom he treated to believe that the men within Mafeking's walls had sufficient stores. The cricket matches also supported the deception by making the besieged seem more able to resist.

In Detroit during the War of 1812, the British employed "Magruder's principles" of deception offensively to even the odds of victory. Magruder's principles state that "it is generally easier to induce an opponent to maintain a preexisting belief than to present notional evidence to change that belief."[41] In Detroit, British major general Sir Isaac Brock played upon the fears and beliefs of the American commander, Brigadier General William Hull, that the British force exceeded the American force significantly, coupled with his fear of Native Americans. In a letter to Major Thomas Evans, General Brock credited Thomas with the idea to clothe the British militia in discarded uniforms from the 41st Regiment of regulars. Brock told Thomas he thought the ruse doubled the size of his force in the Americans' eyes. Additionally, to increase the apparent size of the British force, Brock ordered that soldiers walk through the chow line in a loop such that they surreptitiously dumped the contents of their mess kit in a pot and returned to the end of the line.[42] Brock received an intercepted letter from General Hull indicating his fear of attack from Native Americans to the American secretary of war, William Eustis. Brock used the knowledge of Hull's fear to draft a message to Hull playing on Brock's alliance with Tecumseh and the Shawnee. Brock noted that he would be responsible for the good conduct of his men; however, he could not control the actions of the Native American forces under his command. The letter clearly influenced Hull's decision to surrender Fort Detroit with barely a shot fired on 18 August 1812.[43]

Used offensively in this case, deception served as a force multiplier and played an important role in ending the siege swiftly. Brock disrupted Hull's ability to command and control because he thorough-

[41] *Deception Maxims*, 6.
[42] Maj Ernest A. Cruikshank, *The Documentary History of the Campaign upon the Niagara Frontier in the Year 1812*, Part 3 (Welland, ON: Lundy's Lane Historical Society, 1899).
[43] Donald R. Hickey, *War of 1812: A Forgotten Conflict* (Urbana: University of Illinois Press, 2012), 83.

ly skewed his perception of reality. Rand's Scott Gerwehr and Russell W. Glenn suggest that "deception is used to adversely affect an opponent's decision-making processes, most often to influence or degrade enemy command and control (C2)."[44] Gerwehr and Glenn saw the effects of deception as applicable even down to the individual enemy soldier in a "low intensity urban insurgency."[45] The isolation of the American troops defending the walls of the fort in part allowed Brock's deception to work because the defenders could not verify Brock's claims regarding the Shawnee and could not properly assess the size of the opposing force. The density of a megacity also will likely make deception a tool, which both sides could then use to their advantage.

Tunnels are ancient weapons that remain in the repertoire of modern warfare. They provide life support or efficient means of employing limited resources to attack enemy forces.[46] Historically, armies and insurgents have used tunnels to gain advantage over numerically superior opponents. They tend to prolong sieges, as opposing forces tend to use tunnels when they have sufficient time and expertise to construct them. Although tunnels can prolong conflict, they can also end sieges when used as a weapon, such as in the siege of Smolensk, where they offered a psychological advantage.[47] Just as the leviathan lurks beneath the sea's surface, a tunnel can deliver an unseen threat to an enemy without warning. At the same time, tunnels are symbols of resistance, such as in Gaza. The tunnels provided a morale boost to the Palestinians as both a symbol and a means of their resistance.[48]

In Turin, during the siege of 1706, tunnels extended the ability of the city's Austrian/Savoyard defenders to withstand the French Army until reinforcements arrived to lift the siege. Both Turin's Austrian/Sa-

[44] Scott Gerwehr and Russell W. Glenn, *The Art of Darkness: Deception and Urban Operations* (Santa Monica, CA: Rand, 2000), 20.
[45] Gerwehr and Glenn, *The Art of Darkness*.
[46] Arthur Herman, "Notes from the Underground: The Long History of Tunnel Warfare," *Foreign Affairs*, 26 August 2014.
[47] Herman, "Notes from the Underground."
[48] Khaled Abu Toameh, "Perfume, Viagra, Lions and Fuel: Smuggling Is Gaza's Growth Industry," *Jerusalem Post*, 14 November 2008.

voyard defenders and their French opponents used tunnels to try to break the four-month siege. The French, under the command of General Louis Francois Aubusson, duc de la Feuillade, even tried to build a trench around the city. By late August 1706, Austrian forces feared they would run out of powder and ammunition to sustain the fight and knew they had to develop a strategy to break the siege. The Austrian commander, Weirich Philip Lorenz, count von Daun, focused Austrian efforts on mining and countermining operations as the most efficient means of opposing the French with limited resources.[49] The Savoyard sappers constructed tunnels nearly reaching the French lines. In one case, French forces located a tunnel into the city and a Savoyard sapper had to blow up the tunnel to prevent their entry into the city but lost his life in the process.[50] Rather than dueling artillery, the main effort in the siege of Turin appears to have taken place underground. The tunnels did not deal the final blow to the French forces; the subterranean cat and mouse game engaged the French for months until the armies of Prince Eugene of Savoy and Victor Amadeus II, Duke of Savoy, could relieve the siege.

The battles of Petersburg, Virginia (1864), and Somme, France (1916), took place nearly 50 years apart yet followed similar patterns. In both cases, the attacking force opposing a well defended, fortified position used tunnels to shock their enemies in the hope of breaking a stalemate. In the case of Petersburg, Union troops secretly dug a tunnel under the Confederate lines, filled the tunnel with barrels of black powder, and detonated the powder.[51] Unfortunately, due to errors in executing the plan for after the explosion, the blast trapped advancing Union soldiers in a crater measuring 170 feet long, 60 to 80 feet wide, and 30 feet deep.[52] Unable to scale the crater walls, Union soldiers became easy marks for the stunned Confederates.[53] At Somme, British

[49] Kenneth P. Czech, "Breaking the Siege of Turin," *Military History* 14, no. 6 (1998): 42.
[50] Czech, "Breaking the Siege of Turin."
[51] Alfred P. James, "The Battle of the Crater," *Journal of the American Military History Foundation* 2, no. 1 (Spring 1938), 2–25.
[52] Herman, "Notes from the Underground."
[53] Bryce A. Suderow, "The Battle of the Crater: The Civil War's Worst Massacre," *Civil War History* 43, no. 3 (1997): 221, https://doi.org/10.1353/cwh.1997.0023.

soldiers detonated 450,000 kilograms of explosives underneath Hill 60 on Messines ridge creating an 800-meter crater.[54] The explosion killed or entombed 10,000 German soldiers and eventually the British took the ridge.[55]

The Palestinian tunnels at Gaza demonstrate the asymmetric use of tunnels in warfare. In 2014, Israel Defense Forces destroyed 31 military crossings into Israel.[56] These sophisticated tunnels 60 feet below the surface contained weapons caches and provided avenues to move Hamas fighters, equipment, and kidnap victims. Some tunnels were large enough to drive trucks through.[57] For more than a decade, the tunnels also provided vital support to the inhabitants of Gaza as the means for smugglers to move in goods for resale. Smugglers have moved everything from food and small household items to cars and building materials through the tunnels.[58] When Israel cut off fuel deliveries to Gaza in 2008, smugglers even established a pipeline for fuel and the price of fuel fell by nearly 50 percent. The longer the siege persists, the more sophisticated the tunnels become.[59]

Treachery, deception, and tunnels are likely to remain important tools in modern sieges, particularly in a megacity. Today's sieges may take place without encircling walls, as in Gaza, but the key principle of compelling an enemy to surrender its position remains. In the sieges examined, opposing forces tried to use treachery, deception, and tunnels to gain an advantage and break a stalemated situation. Sources of privileged information regarding the enemy situation and center of gravity serve to hasten victory without significant loss to friendly forces. Deception changes risk gain calculations and can act as a force multiplier in uneven contests. Tunnels can offer sustainment or a means of delivering a knockout punch from below to attack enemy

[54] Mark Day, "Miners of Messines," *Weekend Australian*, 11 August 2007.
[55] Herman, "Notes from the Underground."
[56] Herman, "Notes from the Underground."
[57] Herman, "Notes from the Underground."
[58] Tamer Qarmout and Daniel Béland, "The Politics of International Aid to the Gaza Strip," *Journal of Palestine Studies* 41, no. 4 (Summer 2012): 34, https://doi.org/10.1525/jps.2012.XLI.4.32.
[59] Khaled, "Perfume, Viagra, Lions and Fuel."

forces. Tunnels also bring a psychological advantage to the fight. They can carry with them the terror of the unknown or act as a symbol of resistance. When combating the density of the megacity and the megacity's complex networks, understanding how treachery, deception, and tunnels have contributed to victory in siege warfare will be critical to success.

CONCEPT OF OPERATION

With the Pottery Barn Rule in effect, or its Macy's corollary, it seems clear that a military operation aimed at gaining control of a megacity or its inhabitants must have a different approach to the problem. Gaining control of a megacity will likely involve depriving certain sectors, or even the entire city, of at least some sustainment to compel them to conform to the attacking force's plan. This siege without walls will require a new approach, which preserves the megacity and its power and can harness that power to achieve victory. The new approach will require foreknowledge, deception, and misdirection to change the enemy's reality and bend the enemy to conform to the will of the attacking force without unduly damaging the features making the megacity so valuable.

Sun Tzu stressed the importance of "foreknowledge."[60] Foreknowledge gained through intelligence collection is the central element in battlespace preparation. It requires using all sources of information effectively to understand the center of gravity of the enemy city. While all forms of intelligence are important, gaining insights from human sources within the city with access to key network nodes is the most important. Not only can these human sources inform as to how the network works, they can also highlight critical vulnerabilities or exploitable enemy preconceptions and, in some cases, assist in the exploitation of those vulnerabilities. For example, the right source at the public water company could provide information about how to control the flow of water to certain sectors remotely. Access to major telecommunications companies offers similar benefits. Treachery from within

[60] Sun Tzu said the key to enabling "the good general to strike and conquer, and achieve things beyond the reach of ordinary men, is foreknowledge." Sun Tzu, *The Art of War*, 163.

leads to foreknowledge for the attacking force and increases the opportunity for surprise.

Surprise is frequently an important by-product of deception. Gerwehr and Glenn note that surprise attacks can significantly diminish the cost of attacking in an urban environment. Their research indicates that "surprise changed the ratio of casualties in favor of an attacker from 1:1 to 5:1."[61] U.S. Army general William E. DePuy agreed that surprise changed the combat calculus, although he disagreed with Gerwehr on the magnitude. DePuy assessed that surprise doubled combat power for either side. Regardless of the precise magnitude, it seems clear that surprise lends an increase to combat power. Dr. Barton Whaley, a noted scholar in deception from the Naval Postgraduate School, observed that of the 68 major battles fought between 1914 and 1967, combatants increasingly relied on deception to achieve surprise.[62]

Foreknowledge can feed a successful deception or influence campaign because deception campaigns rely on an accurate understanding of the motivations and desires of the deceived. Noted political scientist Robert Jervis wrote an essay on misperceptions in which he hypothesized that decision makers tend to force new information to fit their existing analysis of a given situation.[63] Foreknowledge is essential to understanding an opponent's preconceived notions to lead an opponent to misperceive the threat and make tactical errors. General Brock in the siege of Detroit is a classic example of this technique. Brock used Hull's belief about the size of the British forces and Hull's fear of a violent attack from Native Americans to achieve victory. Each megacity will differ in terms of what motivates the leadership and its inhabitants. However, shaping the beliefs of the inhabitants of the megacity at all levels of society to achieve desired outcomes for the attacking force seems to be as essential to battlefield success as artillery rounds. Some examples of possible ways to lead the enemy

[61] Gerwehr and Glenn, *The Art of Darkness*, 37.
[62] Gerwehr and Glenn, *The Art of Darkness*.
[63] Robert Jervis, "Hypotheses on Misperception," *World Politics* 20, no. 3 (April 1968): 459, https://doi.org/10.2307/2009777.

to misperceptions could be using deception to increase the apparent size and capability of the attacking force. Deception shaping could include planted stories in local news and social media outlets about a new capability, which could radically alter the conflict. In addition, include news stories about the benevolence of U.S. forces to civilian populations, especially those who cooperate with instructions and do not pose a threat to U.S. forces.

Another important use for deception is to misdirect the location of your attack. Misdirection is particularly effective when paired with an enemy's preconception.[64] The Allies were very successful using this tactic at Normandy. Adolf Hitler remained convinced that the Allies planned to invade at Pas-de-Calais. The Allies had foreknowledge based on Ultra intercepts of Hilter's conviction and used it to craft the Allied deception plan associated with Operation Overlord.[65] Data from a 1980 study completed for the Central Intelligence Agency's Office of Research and Development indicated that deceptions that played to enemy perceptions succeeded more frequently than those that did not.[66] An attacking force could use control over the network nodes, particularly communications, to create the appearance of an impending attack far away from the intended target. The operational plan should include a psychological campaign to undermine the enemy's will to fight. The psychological campaign could incorporate the deception plan, but it could simply use information gained from sources to attack the enemy's morale.

As seen in the siege at Gaza, tunnels have served as a lifeline for the inhabitants. They became both symbols of resistance as well as a means to circumvent the blockade. Given how many megacities have miles of underground tunnels already constructed to accommodate public transportation, denying the enemy the use of these tunnels is critical lest the tunnels protract the siege. A ruse suggesting that a contagion dwells in the tunnels or that the attacking force has rigged the tunnels with explosives and traps would keep people voluntarily

[64] *Deception Maxims*, 7.
[65] *Deception Maxims*, 6.
[66] *Deception Maxims*, 9.

out of the tunnels. The ruse could serve as a force multiplier so that U.S. forces would be needed to guard the tunnel access points. The ruse is not likely to be durable as a stand-alone effort. The ruse has a long military tradition because, according to Vietnam veteran Army lieutenant colonel Richard E. Mack, "the commander who can successfully outwit the enemy doesn't need fire superiority, nor necessarily the advantage of a larger force."[67] In the age of social media, it becomes easy for residents to spread truth about situations on the ground and therefore the ruse execution must be thorough and nested within a larger plan to gain control swiftly.

CONCLUSION

The ultimate goal should be, as Sun Tzu recommends, to win without fighting.[68] The megacities worldwide continue to grow and drive prosperity; however, megacities are not without their weaknesses. Similar to ancient walled cities, megacities seem particularly sensitive to the continuous flow of food, water, and supplies from outside the area. The case study on sieges shows how opposing forces used treachery, deception, and tunnels to gain an advantage in sieges. The case study also demonstrated that foreknowledge gained through the treachery of an insider and a deception represents an excellent means for ending sieges to the deceiver's advantage. Tunnels present a mixed bag. When forces on either side used tunnels to breach the walls, the tunnels succeeded most often when combined with deception or treachery. Tunnels also served as symbols of resistance and often prolonged conflict. Therefore, in the interest of taking a megacity with numerous subterranean tunnels, it seems best to render the tunnels useless to the opposing side. Foreknowledge, deception, and treachery will attack the enemy's power and sap his will to resist. Capitulation with minimal destruction of the megacity is vital to prevent a massive humanitarian assistance problem and to preserve the megacity's economic power. Keeping the Pottery Barn Rule in mind, foreknowledge

[67] Richard E. Mack, "A Case for the Ruse," *Marine Corps Gazette* 52, no. 4 (April 1968): 24–27.
[68] Sun Tzu, *The Art of War*, 109.

will highlight ways to apply force most efficiently to achieve victory. At the same time, foreknowledge could reveal vulnerability in the enemy's perceptions of the situation, which could allow the use of a ruse or a misdirecting deception. Foreknowledge is the key to unlocking the siege and bringing a victory without fighting.

CHAPTER TEN

Symbiotic Warfare

Resource Competition and Conflict

Major Christina L. Manning, U.S. Air Force

In a country dominated by significant population density and resource scarcity, China is looking at a future of drastic competition for services and resources most take for granted. For example, China holds 7 percent of the world's fresh water but currently sustains 20 percent of the human population. China also urbanizes at a much faster rate, pushing toward 250 million more urban residents in the next decade, who will be competing with the agricultural and industrial sectors for water. In the face of a shrinking resource base and increasing pollution, how does a megacity sustain all of that? But, more important, how would the population react should conflict break out in the middle of these resource-constrained megacities?

CONSTRAINT PERPETUATES VIOLENCE

Introduction

Most research on future war analyzes conflict at the macro level using empirical evidence of recent conflicts to suggest that future war will continue between states against nonstate actors.[1] While macro-level

[1] Monika Heupel and Bernhard Zangl, "On the Transformation of Warfare: A Plausibility Probe of the New War Thesis," *Journal of International Relations and Development* 13, no. 1 (2010): 26–58, https://doi.org/10.1057/jird.2009.31.

analysis may be useful in trending patterns of conflict over time, the research fails to address the obvious and overwhelming demographic trends that will change the landscape of future battlefields.

Megacities and their congested environments present new challenges for the military. Densely populated and congested environments rely on robust resource allocation networks and distribution pathways in order to meet the resource demands of the megacity population. Thus, military planners cannot ignore the delicate balance that exists between the population and resources within a megacity. Only through a micro-analytical approach can military and civilian planners adequately determine intervention points to neutralize external predation threats. Thus, whether future threats manifest themselves by nonstate or state actors becomes entirely irrelevant, as the battlefield on which actors will conduct operations will be the megacity.

Problem/Puzzle

While most research proposes concepts and frameworks that characterize the social and environmental aspects of cities, this literature review explores the marriage between ecology and sociology to describe the interdependencies that exist between city populations and their urban ecosystems.[2] Researching how populations behave when adversaries (state or nonstate actors who disrupt a community's ecosystem to exploit resources) appear affords military planners the ability to identify and exploit intervention points for tactical or strategic gain.

Literature Review

According to William R. Catton Jr., "natural systems have limits of tolerance that produce an ensemble of interacting constraints on human action."[3] In his essay, Catton argues that collective behavior theory, when coupled with an understanding of ecosystems, explains how people and societies respond (behave) when faced with urban

[2] William R. Catton Jr., "Probable Collective Responses to Ecological Scarcity: How Violent?," *Sociological Perspectives* 27, no. 1 (January 1984): 3, https://doi.org/10.2307/1389234. See also David J. Kilcullen, "The City as a System: Future Conflict and Urban Resilience," *Fletcher Forum of World Affairs* 36, no. 2 (Summer 2012): 19–39.
[3] Catton, "Probable Collective Responses to Ecological Scarcity," 3.

resource deficits. For Catton, the potential for conflict increases in conjunction with a state's increase in the use of legal governance as a means to regulate competitive consumption of natural resources. Thus, scarcity of resources will drive individuals and entire societies (beyond states) to engage in networked exchanges as a method of adapting to anticipated competitive encounters.[4] According to Catton, as urbanization increases the demands on natural resources, urban societies will confront an eventual scarcity of resources derived from indispensable biological systems (e.g., forests, cropland, grazing lands, and fisheries).[5] Acting collectively, states and individuals within a society will seek to justify their actions to control and harvest resources. Such preemptive aggression manifests itself as competition grows because of resource capacity deficits.

Violence may arise at the state or city level if panic occurs. For clarification, social science defines panic as "the aggregation of how groups behave when demoralization occurs due to events departing radically from culturally instilled expectations."[6] Panic ensues due to either perceived or actual resource deficiencies.[7] If panic occurs, individual actions cease to be concerned with group interests and individuals become preoccupied with self-preservation.[8] The normal mode of panic manifests itself in the form of crowds, which occur when individuals congregate collectively to express individual interests.

Depending on which social science theory one subscribes to, crowds behave either rationally or irrationally. For the sake of argument, sociologist Neil J. Smelser's "value-added process" theory of collective behavior promotes a sound argument that not all crowds act irrationally.[9] According to Smelser, and complemented by Catton, crowds (even rational crowds) may resort to violence due to an

[4] Catton, "Probable Collective Responses to Ecological Scarcity," 7. See also William H. McNeill, *The Pursuit of Power: Technology, Armed Force, and Society since A.D. 1000* (Chicago: University of Chicago Press, 1982).
[5] Catton, "Probable Collective Responses to Ecological Scarcity," 3.
[6] Catton, "Probable Collective Responses to Ecological Scarcity," 8.
[7] Catton, "Probable Collective Responses to Ecological Scarcity," 8.
[8] Catton, "Probable Collective Responses to Ecological Scarcity," 8.
[9] Neil J. Smelser, *Theory of Collective Behavior* (New York: Free Press, 1965).

increase in panic that manifests when strain increases. Strain, in an urban setting, arises when commercial and governance mechanisms do not aggregate enough resources to sufficiently relieve strain. Thus, strain, whether actual or perceived, can lead to violence if the strain on a particular system (i.e., resource system) is not relieved. According to Smelser, and promoted by Catton, a containing entity can only relieve panic by ensuring routes of escape from threat are identified, left completely open, or are perceived to remain open to the public. A perceived or actual strain on an urban ecosystem will cause panic, which may manifest violence if a controlling entity or governance system cannot alleviate or contain the strain on resources. In a megacity, strain is typically the result of resource scarcity. In an urban context, scarcity includes strains on the commodities essential to daily living (e.g., money, groceries, and fuel).[10] Therefore, strain on resources from an actual or perceived threat may lead a population to resort to violence as a matter of self-preservation. Violence will disrupt the resource allocation networks and distribution pathways controlled by the city and state. If the networks and pathways become vulnerable to attack, primary and opportunistic predation of resources may occur.

Predation of resources in a densely populated environment may increase the propensity of violence against civilians. The increase in civilian violence may continue. For example, social scientists, such as Monika Heupel and Bernhard Zangl, offer macro-level analysis of how warring parties have increasingly propagated violence against civilians during the last few decades.[11] Heupel and Zangl explore the hypothesis that fragmentation of warring parties and the economization of their war motives facilitate the application of brutal violence against civilians.[12] As such, new wars are different from old wars in that agglomerated populations act as warring parties and wage wars against states. In contrast, old wars are characterized by a state waging war against another state—even if done by proxy. Still seeking an overall political objective, Heupel and Zangl categorize agglomerated

[10] Catton, "Probable Collective Responses to Ecological Scarcity," 8.
[11] Heupel and Zangl, "On the Transformation of Warfare," 26–58.
[12] Heupel and Zangl, "On the Transformation of Warfare," 26–58.

populations by their economy, motives, and strategy. Their research uses case studies from Cambodia, Afghanistan, Angola, Somalia, and Sierra Leone to characterize how warring parties conduct violence. Heupel and Zangl's conclusions suggest that ideological and identity-based motives of warring parties generally did not disappear but increasingly merged with economic motives. Furthermore, their study reveals a troubling trend. Drawn from empirical and case study evidence using several of the aforementioned case studies, agglomerated populations operating in dense environments have increasingly relied on strategies that entail brutal violence against civilians.

Drawing parallels between densely populated societies and megacities makes for an easy transition. Under the megacity scenario, warring parties would commit an intentional disruption of the ecosystem to acquire or control resources and related commodities. Regardless of their motives or claims of legitimacy, warring parties in a megacity will operate within the population in an effort to disrupt the balance of the ecosystem and to manipulate the resource allocation networks and distribution pathways that supply a city. Based on this analysis, the term predation refers to an act committed by agglomerated populations (a.k.a. predators), which seek to control or exploit a community's resources.

In a predation scenario, predators will increase violence targeted at civilians. Referring back to the aforementioned empirical study, the propensity toward civilian violence occurs for three reasons. First, agglomerated populations that either maintain criminal war economies or heavily rely on other criminals are more likely to employ brutal warfare strategies because these activities (e.g., looting and blackmailing) normally entail violence against the local population.[13] Second, with the shift toward economic (resource) motives, agglomerated populations will no longer fight for the interests of the local population, lowering the agglomerated population's inhibitions to commit violence. Third, as an agglomerated population loses the ability to control individual factions, brutal violence against the local population is likely

[13] For a thorough discussion of war economies and shadow economy networks, see Michael Pugh and Neil Cooper, with Jonathan Goodhand, *War Economies in a Regional Context: Challenges of Transformation* (Boulder, CO: Lynne Rienner, 2004).

caused by the fragmentation of the agglomeration population itself.[14]

Other scenarios that threaten urban ecosystems beyond predation require analysis and mention. For example, natural disasters ellicit a different social network response when a community is threatened. Interestingly, research illustrates that people and nations that experience imposed (intentionally manipulated) resource constraints are likely to react as a "disaster community."[15] For example, in times of resource instability caused by natural disasters, initial behaviors can be characterized by reacting in a brief stage of "immobility," where people "under react to the event, failing to comprehend its magnitude" followed by an emphasis of "activity for activity's own sake."[16] In such a situation, cities, communities, groups, and nations that suffer consequences resulting from the natural disaster may become easy targets for outside predators seeking to exploit resources.[17] Whether through direct predation or caused by natural disaster, ecosystem analysis when coupled with collective behavior theories affords civil and military planners the ability to predict behaviors of megacity populations when an internal or external threat disrupts a community's access to resources.

Understanding predation in a megacity context requires military and civilian planners to understand the megacity conflict environment that, according to David Kilcullen, is the result of three main drivers: urbanization, littoralization, and connectedness. Kilcullen describes connectedness by characterizing coastal cities as networked, connected, and linked.[18] Using demographics and incidents in Somalia to reinforce his claims, Kilcullen suggests that networks are neither licit

[14] Heupel and Zangl, "On the Transformation of Warfare," 34.

[15] For a detailed discussion of disaster communities and the behavior of social networks established by communities in response to natural (and imposed) disasters, see Alan Kirschenbaum, "Generic Sources of Disaster Communities: A Social Network Approach," *International Journal of Sociology and Social Policy* 24, no. 10/11, (2004): 95–129, https://doi.org/10.1108/01443330410791073.

[16] Catton, "Probable Collective Responses to Ecological Scarcity," 14.

[17] For further discussion, see Catton, "Probable Collective Responses to Ecological Scarcity," 14.

[18] According to Kilcullen, urbanization is clustered in littoral (coastal) areas. "Coastal cities are networked internally, connected to the rural hinterland, and linked with ethnic diaspora populations and global networks." Kilcullen, "The City as a System," 19–39.

nor illicit and that "people self-organize in networks and engage in a complex hybrid of illicit and licit behavior that rides the connectedness of coastal urban areas."[19]

Zoning in on connectedness, Kilcullen's essay brings up several interesting points. First, he offers a conceptual framework model to visualize the interdependencies of and connectedness between a city's periurban areas and key transportation nodes. In his concept, Kilcullen defines periurban areas as "the slums and townships around the margins of growing cities that account for a high proportion of new immigrants from the countryside."[20] Kilcullen also defines transportation nodes as "airports, intermodal logistics hubs, container terminals, free trade zones, and seaports."[21] Transportation nodes are usually located in periurban areas. Transportation network workers also live in periurban areas. Furthermore, periurban areas experience weaker governance; increased crime, poverty, and unemployment; and often suffer greater shortages of food, fuel, electricity, and water.[22] Fusing Kilcullen's argument with Catton, Smelser, Huepel, and Zangl's theories, conflict could spark violence if panic or resource capacity deficits grow or predators exploit transportation nodes.[23]

Categorizing future threats, Kilcullen comes to the same conclusion as Catton and Smelser, suggesting that future predation threats will manifest from both irregular actors and methods. The gravest future threats will come from irregular actors (agglomerated populations) who avoid direct confrontation with military and police forces. These nonstate armed groups (predators) will employ stealth, operate

[19] Kilcullen, "The City as a System," 25.
[20] Kilcullen, "The City as a System," 24.
[21] Kilcullen, "The City as a System," 24.
[22] Kilcullen, "The City as a System," 28.
[23] For an additional definition of nodes beyond tangible assets, see Jacob Apkarian et al., "Hierarchy in Mixed Relation Networks: Warfare Advantage and Resource Distribution in Simulated World-Systems," *Journal of Social Structure* 14, no. 1 (2013): 1–17. The article provides a mathematical framework for validating the theory that societal evolution is really coevolution and that the exigencies that confront a single society will push that society to adapt to the problems it faces. Therefore, low power actors benefit by being excluded from coercive relations, while high power actors inevitably suffer. Furthermore, regardless of whether an actor is high or low power, exclusion from exchange is always detrimental.

in small teams, and combine tactical initiative with local knowledge.[24] In this type of scenario, the population becomes the maneuver space.

Furthermore, manipulation of networks (social, transportation, or economic) will be the source of hybrid threats.[25] While all of these threats require some level of manipulation of activities within a megacity, governments (e.g., the United States) must clarify legal distinctions between warfare and law enforcement to promote enhanced cooperation. Kilcullen suggests capabilities that combine policing, administration, and emergency services with sufficient military capability to deal with well-armed nonstate adversaries are likely to be more effective than military or constabulary efforts alone.[26] Of note, Kilcullen also claims networks will be "nested" in the complex urban littoral environment, avoiding detection "by remaining beneath the clutter of urban development and overpopulation."[27] Thus, in addition to redefining roles and relationships of the military and constabulary, the military must adopt an operating concept that accounts for the symbiotic nature of the megacity population in relation to its resources. Only by holistic analysis can military and civilian planners determine intervention points available to assist a community effort aimed at neutralizing predation.

Kilcullen proposes three types of intervention points in his essay. First, he identifies and classifies supply-side interventions as those that ameliorate drivers of rabid urbanization and ease pressure on infrastructure. Second, he suggests demand-side interventions, or those that improve a city's resiliency to cope with pressures on

[24] Kilcullen, "The City as a System," 29. Kilcullen suggests using Mumbai as a case study to analyze the networks and study irregular actors and their methods. China, where more than 51 percent is urbanized, also makes a good case study to understand how greater connectedness affords civilian populations greater access to advanced technologies, enhancing the civilian population's military potential.

[25] Kilcullen, "The City as a System," 19–39.

[26] Kilcullen, "The City as a System," 32.

[27] Kilcullen, "The City as a System," 33. Note that the recent example of operations in August 2009 to extradite Christopher Coke, Jamaica's former prime minister, to the United States exemplifies how nested networks complicate operations in a megacity environment. Overall, the operation led to 500 arrests and 73 lives lost in the efforts to extract a single crime boss from one urbanized, networked, and littoral environment. For more on this event, see Mattathias Schwartz, "Jamaica's Former P.M. Opens Up about Coke Arrest and Extradition," *New Yorker*, 3 August 2012.

its systems. Third, he categorizes framing-system interventions, or those that alter the context of how the city develops, changing its interaction with national and transnational systems.[28] Operations and efforts targeted toward intervention points provide planners with a proactive versus reactive response. This method supports Catton's claims and other social science research that illustrates how a resource-controlling entity can manipulate a population's behavior by controlling resource-allocation networks or distribution pathways. For military planners, intervention points are synonymous with resources that are critical vulnerabilities. As in nature, predation and the predation process are synonymous with invasion processes. Military planners must map the invasion process to determine resource-intervention points to assist communities in neutralizing predation.

Conclusion

Ecology and sociology research suggest that violence will erupt when resource constraints motivate a collective population (e.g., group, crowd, or warring party) to mobilize to manipulate control of networks directly related to resource allocation and distribution. Understanding how populations behave when internal or external threats disturb their ecosystems (intentionally or unintentionally) affords planners the ability to identify critical vulnerabilities in resource-allocation networks and distribution pathways. These critical vulnerabilities serve as intervention points for military planners to use when attempting to neutralize a resource-predation threat.

Redefined Problem Statement

Whether military planners generate operations to quell violence or strive to prevent it, planners must identify vulnerabilities in resource-allocation networks and distribution pathways to ensure densely populated and congested communities have access to essential resources. Observing the invasion process via the use of agent-based modeling allows planners to draw conclusions about predation and the invasion process as it naturally occurs.

[28] Kilcullen, "The City as a System," 37.

WHEN PREDATORS BECOME PREY: OBSERVING CHARACTERISTICS OF INVASION

The purpose of this case study is to use invasion biology agent-based models to observe the effects invasive species have on a community's (ecosystem) resources, infrastructure, and native population. Doing so allows researchers to draw parallels between biology and military science to conceptualize how the invasion of a megacity might occur. Invasion biology, which explores densely populated, congested environments, affords researchers numerous examples of how invasion affects a community.[29] Whether caused by invasive pathogens or intraspecific predation, invasion biology affords researchers the ability to study how populations in congested environments react to predators in the hope that a pattern of the invasion process will reveal itself.

Building on the previously conducted literature review, which concluded that megacity warfare will occur due to a competition for limited resources, this case study uses the biological understanding of intraspecific competition (competition for resources between the same species) to draw conclusions about how adventive species (predators) may invade a megacity for the control or manipulation of resources. This case study then summarizes the observations drawn from both empirical studies of invasion ecology as well as agent-based modeling to illustrate how a community (a function of native population and habitat) responds to an invasion. Such conclusions may prove useful to military planners seeking to identify intervention points to assist a community in neutralizing predation threats.

Introduction to Empirical Study Review

Invasion biology expands beyond the study of the natural distribution patterns of living organisms to examine how nonnative (adventive) species are introduced, spread, and interact with native species in an

[29] For further justification of modeling ecological systems, see S. T. A. Pickett et al., "Urban Ecological Systems: Linking Terrestrial Ecological, Physical, and Socioeconomic Components of Metropolitan Areas," *Annual Review of Ecology and Systematics*, no. 32 (2001): 127–57, https://doi.org/10.1146/annurev.ecolsys.32.081501.114012.

ecosystem.[30] In the study of invasion biology, most adventive organisms are introduced to a receiving ecosystem as a result of human action.[31] Furthermore, the native population of an ecosystem historically maintains a competitive advantage over ecosystem resources, resulting in the failure of an adventive species to establish occupancy.[32] The success of an invasive species is directly dependent on the ability of the native population (community) to control resources or prevent the adventive species from acquiring resources. Translating this into a megacity concept, this case study affords researchers the ability to test the hypothesis that the ability of the native population (community) to retain access to resources and deny those resources to predators directly correlates to a megacity community's ability to resist invasion from agglomerated populations (predators) that seek to exploit resources.

General Observations of Invasion Behavior

Biology affords numerous examples of why invasion, or the ability of predators to extort resources, succeeds or fails.[33] Scientists have proven that the vulnerability of a community's ecosystem is more crucial in determining whether invasion succeeds or fails than the biological characteristics of the predators themselves.[34] For example, studies illustrate that geographically and historically isolated environments contain a low diversity of native species, exhibit high levels of natural disturbance or human activities, and illustrate an absence of coadapted enemies (e.g., competitors, predators, parasites, and disease), which makes them more susceptible to invasion.[35]

Ironically, the vulnerability of the adventive organism in relation to the ecosystem's native population explains why most invasions fail.

[30] Jannike Falk-Peterson et al., "On the Numerous Concepts in Invasion Biology," *Biological Invasions* 8, no. 6 (September 2006): 1,409, https://doi.org/10.1007/s10530-005-0710-6.
[31] Falk-Peterson et al., "On the Numerous Concepts in Invasion Biology," 1,411.
[32] Thomas E. Miller et al., "Effect of Community Structure on Invasion Success and Rate," *Ecology* 83, no. 4 (2002): 898, https://doi.org/10.2307/3071899.
[33] For the analysis and summary of more than 45 conducted studies, see Dov F. Sax and James H. Brown, "The Paradox of Invasion," *Global Ecology and Biogeography* 9, no. 5 (2000): 363–71, https://doi.org/10.1046/j.1365-2699.2000.00217.x.
[34] Miller et al., "Effect of Community Structure on Invasion Success and Rate," 898.
[35] Sax and Brown, "The Paradox of Invasion," 363.

For example, "established species with a substantial geographical range are sustained in part by the positive feedback effects of dispersal on local population dynamics."[36] Unless the local population permits an adventive organism (predator) to disperse, the adventive species is subject to extinction.[37] As with islands, which are the most vulnerable ecosystem to invasion, an adventive, invasive species will "exploit the entire range of resources and habitats."[38] For invasion to be successful, an adaptive, invasive species must determine its capacity to exploit a particular resource against the spectrum of resources obtainable in the new habitat.[39]

Most observation and theoretical studies regarding the process of invasion emphasize the traits of the invaded community or habitat versus focusing on traits of the invasive species, with good reason.[40] An invasive, adventive organism is only successful if it can "displace the native species or use empty or underused niches to establish occupancy."[41] Resource availability (ability to control or gain access to resources) is the main limiting factor in the ability of a predator to invade. In a megacity scenario—as illustrated by invasion pathology, microbiology, and ecology—invaders target both vulnerable populations and pathways. Where the local population and resources are most vulnerable is where invasion is likely to occur.[42]

Scientists also have studied the effects of resource levels on invasion. Studies conducted by scientists, such as I. C. Burke, J. P. Grime, and L. F. Hueneke, illustrate that as the native population's dependence on resources increases, the threat of successful predation actually

[36] Sax and Brown, "The Paradox of Invasion," 365.
[37] Sax and Brown, "The Paradox of Invasion," 364.
[38] Sax and Brown, "The Paradox of Invasion," 367.
[39] Sax and Brown, "The Paradox of Invasion," 366–67.
[40] Miller et al., "Effect of Community Structure on Invasion Success and Rate." 898.
[41] Miller et al., "Effect of Community Structure on Invasion Success and Rate," 898.
[42] James H. Brown, "On the Relationship between Abundance and Distribution of Species," *American Naturalist* 124, no. 2 (1984): 255–79.

decreases.[43] Notably, a community's codependency on and proximity to resources significantly impeded an adventive species' ability to invade.[44] In a megacity with a high density of population and a high codependence of resources, the determining factor for a predator's success relies on the predator's ability to control and desegregate the population from resources. Therefore, it is more advantageous to explore a community's vulnerabilities in resource-allocation networks and distribution pathways than to analyze the characteristics of a predator or to target the predators.

Interestingly, research has shown that natural or introduced (manipulated) predators have the potential to serve as a deterrent against an invading species. For example, one study proved that lizard predators impeded the establishment of spiders on islands and thereby deterred an adventive, invasive species from acquiring the resources necessary to establish a habitat.[45] In this study, the invasive species (predator) became the prey and the probability of invasion success was limited.[46] Translating this to a megacity concept, a third party or introduced natural enemy of the predator may prove successful if the local population embraces the third party and the introduction of the third party does not result in disruptive effects on the megacity's natural functioning (access to resources).

Figure 10.1 illustrates the differences between natural and introduced predators into an ecosystem. Note that this case study is limited to exploring intraspecific competition between natural and introduced predators that migrate to a habitat. This study does not attempt to analyze secondary, opportunistic predators that may come from within or introduce themselves to a habitat to capitalize on an adventive species invasion already underway.

---

[43] Miller et al., "Effect of Community Structure on Invasion Success and Rate," 899. See also, Charles S. Elton, *The Ecology of Invasions by Animals and Plants* (London: Methuen, 1958); and Ted J. Case, "Invasion Resistance Arises in Strongly Interacting Species-Rich Model Competition Communities," *Proceedings of the National Academy of Sciences* 87, no. 24 (1990): 9,610–14, https://doi.org/10.1073/pnas.87.24.9610.

[44] Case, "Invasion Resistance Arises in Strongly Interacting Species-Rich Model Competition Communities," 9,610–14.

[45] Miller et al., "Effect of Community Structure on Invasion Success and Rate," 899.

[46] Miller et al., "Effect of Community Structure on Invasion Success and Rate," 899.

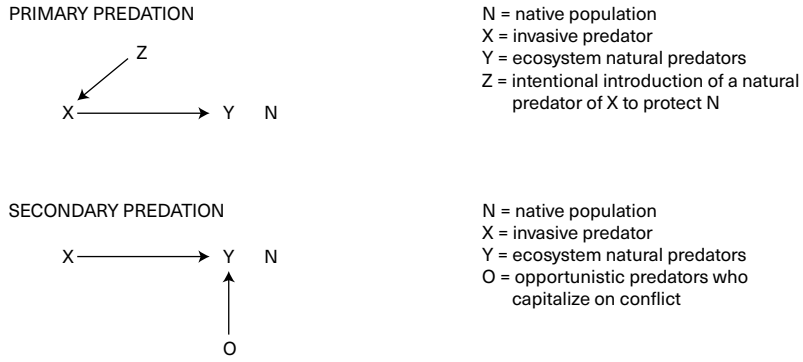


Figure 10.1 Intraspecific competition with opportunity and risk.
Illustration by MCUP

Introducing more variables into invasion research, Thomas E. Miller et al. discovered that a variety of factors (migration, predation, and resource availability) influenced invasion capability of similar protozoans.[47] They manipulated the resources available, accounted for the natural predators within a given ecosystem in relation to the invasive species, and introduced additional nonnative predators to the ecosystem.[48] Their results validated the hypothesis that the probability of successful invasion is dependent on an ecosystem's resource availability, species interactions, ease of invasive species dispersal, and the invasive species' ability to react in the new habitat when third parties are introduced to counter the predation threat.[49] Drawing on parallels for a megacity scenario, the probability of successful invasion by external predation correlates directly with a megacity's ability to provide resource control, target invaders through the use of native predators (e.g., law enforcement), as well as use introduced, welcomed predators (e.g., third party intervention) to limit predator dispersal.

[47] Miller et al., "Effect of Community Structure on Invasion Success and Rate," 899.
[48] Miller et al., "Effect of Community Structure on Invasion Success and Rate," 899.
[49] Miller et al., "Effect of Community Structure on Invasion Success and Rate," 904.

Predator/Prey Population and Models

If researchers regard the megacity as a complex ecosystem and conclude that this ecosystem is susceptible to invasion by adaptive predators that possess the capacity to exploit resources, then researchers can further explore predator/prey interactions. By modifying both predator and prey variables and coefficients using NetLogo software and applications, researchers can model predator/prey interactions with multiple variables. Predator/prey models, such as the Lotka-Volterra model of predator/prey interaction (logistics growth equation), allow biologists to analyze how two interacting populations either grow or decline over time in the same habitat.[50] In most predator/prey models, researchers observe a native population in a given habitat and then introduce a natural predator of that population to observe effects. Researchers commonly use a sheep (prey) versus wolf (predator) model to study predator/prey interactions. Using NetLogo, researchers manipulate the population of both predator and prey as well as observe the effects of predation when the amount of resources (grass) is increased and decreased.

One notable study extrapolated data from the wolf/sheep predator/prey model to foster a better understanding of guerrilla warfare. Specifically, Michael D. Intriligator and Dagobert L. Brito analyzed intraspecific competition of predators by adapting the Lotka-Volterra logistics growth model.[51] By using a system of differential equations to account for population variables—the number of predators "x" at time "t," the number of natural predators to combat "x" at time "t," and the size of the prey population controlled by "x" at time "t"—they effectively adapted the predator/prey model into a guerrilla warfare model. In their study, they reassigned some of the native sheep populations to assume the role of a predator competitor against the wolf predator. Additionally, they set up a control that neither the reassigned sheep (predator population) nor wolf (secondary, invasive predator) would "feed" directly on the other but would grow in relation to its own popu-

[50] Alfred J. Lotka, *Elements of Mathematical Biology* (New York: Dover Publications, 1956).
[51] Michael D. Intriligator and Dagobert L. Brito, "A Predator-Prey Model of Guerrilla Warfare," *Synthese* 76, no. 2 (August 1998): 235–44, https://doi.org/10.1007/BF00869590.

lation. In their model, they attributed fluctuations in wolf (invasive predator) populations to both manipulated recruitment and loss rates.[52]

The model effectively illustrated that the ratio of soldiers to guerrilla forces as criterion for controlling predation success was flawed.[53] According to results, the ratio of natural predators (predator sheep) to the native sheep (prey) population controlled by the wolves (invasive predators) must be higher than a certain value. This implied that the targeted variable for manipulation was not the population of the invaders or the natural predators designed to target the invaders, but that of the native population.[54] The ability of the predators (guerrilla forces) to segregate the population from resources and limit soldiers' ability to secure resources for the population proved instrumental to the guerrilla forces' success. Ultimately, their study illustrated the important role both the native population and resource access plays in predation.

Using NetLogo to observe the dependency of resources as a variable of predator/prey populations, this researcher extrapolated the predator/prey wolf/sheep model to observe how those interactions would take place in a resource-constrained environment.[55] In this model, the population of both predator and prey fluctuated dramatically in proportion to the amount of grass available for sheep consumption. Under stable conditions within the ecosystem, predator/prey populations fluctuated at a predictable rate; however, the introduction of resource depletion (e.g., burning the grass in the model) resulted in a rapid growth of predator to prey populations. Observing interactions, this researcher concluded that increased competition for resources between the predator and prey populations directly influenced the ability of the predator to disperse and increase its population size. Translating this to a megacity scenario, the research proves that a native population's drive to maintain control over resources directly limits the ability of predators to successfully invade.

[52] Intriligator and Brito, "A Predator-Prey Model of Guerrilla Warfare."
[53] Intriligator and Brito, "A Predator-Prey Model of Guerrilla Warfare."
[54] Intriligator and Brito, "A Predator-Prey Model of Guerrilla Warfare."
[55] U. Wilensky, "Wolf Sheep Predation," Center for Connected Learning and Computer Based Modeling, Northwestern University, 1997.

To observe the behavior of predator/prey ecosystems when secondary (third party) predators introduce themselves into an ecosystem, this researcher explored a different NetLogo model.[56] In this study, birds (predator) and bugs (native population) wander randomly around a landscape. Each step costs both species energy and both birds and bugs must consume resources (bugs must eat grass and birds must eat bugs and other introduced invaders) to replenish their energy. Grass grows at a fixed rate, and when eaten, this researcher deducted a fixed amount of resources from the resource patch. This researcher introduced mice (secondary predators) as invasive species to represent indirect competitors of the bugs. This researcher also introduced other disruptions, such as simulating a disease to remove a portion of the bug population or burning down grass to remove the food source for bugs and invasive species. Overall, this researcher observed the natural population and the third-party predators were successful in neutralizing the invasive threat of the unwanted predators as long as the third-party predators did not disrupt resources necessary for the native population. The conclusions derived from this modeling event support general, empirical observations as well as other predator/prey and intraspecific competition results previously mentioned.

A summary of the conclusions drawn from previous research, as well as this researcher's own studies, regarding both predation and invasion include:

- The ability of the native population (community) to control resources directly correlates to the megacity's ability to resist invasion by an adventive species (predator).
- Environments that are geographically and historically isolated, contain a low diversity of native species, exhibit high levels of natural disturbance or human activities, and illustrate an absence of coadapted enemies (i.e., competitors, predators, parasites, and disease) are more susceptible to invasion.
- Invaders target both vulnerable populations and pathways.

[56] M. Novak and U. Wilensky, "Bug Hunt Predators and Invasive Species," Center for Connected Learning and Computer-Based Modeling, Northwestern University, 2011.

Where the local population and resources are most vulnerable is where invasion is likely to occur.

- It is more advantageous to explore a community's vulnerabilities than to analyze the characteristics of the predators.
- A third party or introduced natural predator to counter an invasive species may prove successful if the host community embraces the third party.
- The probability of successful invasion by external predators correlates directly with the megacity's ability to provide resource control; target invaders by the use of native predators (law enforcement); as well as use introduced, welcomed predators (third-party intervention) to limit predator dispersal.
- An opposing force should consider targeting and vying for control over the natural population versus seeking to capture or destroy invasive predators.
- The ability of the native population to maintain control over resources is directly dependent on the ability to mitigate the dispersal of predators.

Interdependency of Three Key Variables

All three models suggest a direct relationship between the ecosystem resources (proximity dependent), prey populations, and predator populations. Manipulating one variable proves to have dramatic consequences on the others. Therefore, researchers must take a holistic approach to understanding invasion.

When analyzing invasion, researchers must consider all three components: the predator, native population, and resources as dependent variables. The native population and resources, as well as the infrastructure essential to ensure the delivery of resources, combine to form a community. Researchers should think of the community as a habitat. A community resilient to predation is a community that ensures the natural population remains in control and in direct proximity to the resources essential to sustaining it.

In a megacity, where resource proximity and infrastructure are critical to ensuring the stability of a population, the determining factor

for invasion is the community population. Therefore, military forces and law enforcement should focus efforts on securing the local population and protecting resources versus solely targeting or hunting predators. Participation of the local population and reducing vulnerabilities that exist in resource-allocation networks and distribution pathways ultimately affects predation success.[57] As invasion studies and modeling illustrate, predators ultimately become the natural prey of the community in resource-constrained environments. The more densely populated the community, the harder it is for an adventive species to survive.

SYMBIOTIC WARFARE OPERATING CONCEPT

The Concept of Predation in Relation to Future Warfare

Future conflict is likely to erupt as the result of a competition for resources between actors.[58] Relating back to the basics of supply and demand, those without sufficient abundance of supply will target and exploit the supply of others. If worldwide demographic trends continue, actors struggling for resource demands are likely to find themselves doing so in a megacity environment. The congested and densely populated environment of the megacity requires more than just analysis of infrastructure and urbanization if the military plans to conduct effective operations. Actors on the losing side of the supply scale can be state or nonstate actors, but ultimately these agglomerated populations have one strategy objective in mind: use the population as maneuver space to gain access to resources.

Defined for our purposes as predators, agglomerated populations use violence and disruptive means to acquire resources. These predators, which have no political motivation, seek only to control and manipulate resource-allocation networks and distribution pathways to

[57] Note that the effects of damage to ecosystem infrastructure were not modeled in this case study. Models that illustrate how damage to resource infrastructure may lead to crowed pathways, resulting in the ultimate breakdown of ecosystem function, should be considered by future analysts who seek to elaborate on these concepts.

[58] For more information on the environment and security, see Thomas F. Homer-Dixon, "Environmental Scarcities and Violent Conflict: Evidence from Cases," *International Security* 19, no. 1 (Summer 1994): 5–40.

achieve their ends. The population is just maneuver space. However, predators that seek to exploit or harvest resources within a megacity face an enormous challenge. Concepts extrapolated from invasion biology and ecology prove that the best means for neutralizing predation threats in densely populated environments is by leveraging the local population. If predators aim to use the population as maneuver space, then leveraging the population to destabilize a predator's maneuver becomes the objective. A secondary objective to support neutralization is the ability of the military to provide the population access to resources. Studies prove that any disruption to resource-allocation networks or distribution pathways will destabilize the community and afford predators the opportunity to disperse, scatter, and ultimately invade.

Overview

The symbiotic warfare operating concept (SWOC) describes how the future Joint force will shape the megacity operating environment and neutralize threats acting as a complementary extension to an already existing, networked community infrastructure. The SWOC guides future force development by identifying capabilities the Services will need to conduct operations in a megacity. To conduct operations in such an environment, the SWOC requires platforms and capabilities that must: 1) facilitate military maneuver in congested and potentially contested environments to secure resource networks and distribution pathways vital to the population, and 2) minimize disruption to those resource networks and distribution pathways. Therefore, the SWOC vision of future warfare explores how the military will work in parallel with the local population and public service networks to ensure the uninterrupted flow of resources and services to the population. As a result, SWOC serves as both the ways and means of securing resources and neutralizing predation threats that seek to disrupt flow.

Symbiosis and the Character of Megacity Conflict

SWOC emphasizes the importance of maintaining a holistic view when conducting operations in a congested environment, such as a megacity. Densely populated environments and the complex networks that

support resource allocation and distribution to the population exist in a delicate, symbiotic balance. Thus, SWOC affords community and military planners the ability to identify and exploit intervention points for tactical or strategic gain. The primary objective of SWOC is to neutralize external threats by ensuring resource-allocation networks and distribution pathways remain secure and open to the population. The neutralization of predators is a secondary effect of the military's efforts to keep resource-distribution networks and pathways open to the community. In such a scenario, the community, not the military, targets and neutralizes the predator(s).

The SWOC also serves to describe the interdependence and connectedness that must exist between the military, public services, and local population. Similar to military operations on urbanized terrain (MOUT) doctrine and counterinsurgency (COIN) doctrine, symbiotic warfare considers geography, population, and the adversary as interdependent variables. However, the military is only successful in achieving the main objective in the SWOC by effectively using the local population and infrastructure as maneuver space. For the military, the objective in the SWOC is not the neutralization of predators, but to keep the resource pathways open to the population in order for the population, working with law enforcement, to neutralize predators.

The SWOC Is Not Siege Warfare

The SWOC attempts to stabilize and minimize disruption in the megacity by differentiating itself from siege warfare. The DOD defines siege warfare as the employment of combat forces to physically occupy and control a designated area.[59] As a tactical mission, the Army and Marine Corps define *seize* as a military force taking possession of a designated area using overwhelming force or clearing a designated area to obtain control of it.[60] The SWOC is geographically agnostic in the sense that the military objective is to control resources within the terrain and minimize infrastructure damage to avoid disruptions in the daily operations of the community. Furthermore, the use of overwhelming force

[59] *Operational Terms and Graphics*, FM 101-5-1 (Washington, DC; Department of the Army, 1997), 1–168.
[60] *Operational Terms and Graphics*, 1–168.

or the dispersal of the population because of military operations will disrupt distribution pathways and networks and stress the capacity of civil services to provide sustenance for personnel. Therefore, symbiotic warfare operations require the military to act as an augmentation force to the local community with the military's primary objective to ensure resource-allocation networks and distribution pathways remain open.

The SWOC Is a Synthesis of Urban Warfare, COIN, and Irregular Warfare

Symbiotic warfare encompasses urban warfare and military tactics associated with military operations on urbanized terrain doctrine and COIN doctrine.[61] By definition, *Military Operations on Urbanized Terrain* and *Joint Urban Operations* outline the tactical and capability options available to a commander in an urban environment.[62] Explicit in describing the street, subterranean, and air battlespace, urban doctrine takes into consideration that "the basic principles of combat in built-up areas have essentially remained unchanged in this century."[63]

Where the SWOC and urban operations doctrine agree are on the importance of maneuver warfare and combined arms philosophies in the urban environment.[64] Where they disagree are on the factors that will have an impact on the manner in which military forces, including the Marine Corps, conduct urban warfare. For example, *Military Operations on Urbanized Terrain* uses historical examples of warfare to suggest the critical factors that contribute to effectiveness are intelligence, surprise, and combined arms. Combined arms, according to this doctrine, require essential categories of weapons in association with: 1) infantry, 2) armor, 3) artillery, 4) mortars, 5) antiaircraft artillery, and 6) aviation.[65] While these types of weapons and capabilities were essential in 1998, technological advancements of the U.S. military

[61] *Military Operations on Urbanized Terrain (MOUT)*, MCWP 3-53.3 (Washington, DC: Headquarters Marine Corps, 1998); *Joint Urban Operations*, JP 3-06 (Washington, DC: Chairman of the Joint Chiefs of Staff, 2013); and *Counterinsurgency*, JP 3-24 (Washington, DC: Joint Chiefs of Staff, 2013).
[62] *Military Operations on Urbanized Terrain*, 1-2; and *Joint Urban Operations*, I-2–I-7.
[63] *Military Operations on Urbanized Terrain*, 1-8; and *Joint Urban Operations*.
[64] *Military Operations on Urbanized Terrain*, 1-12; and *Joint Urban Operations*.
[65] *Military Operations on Urbanized Terrain*, 1-13–15; and *Joint Urban Operations*.

and our adversaries require the United States to update doctrine to account for operational concepts, tactics, and new types of tactical lethal and nonlethal weapons required to conduct operations.

Additionally, *Joint Urban Operations*'s discussion of the urban operating environment does not account for the interconnectedness between densely populated environments and access to resources. As the previous literature review illustrated, panic ensues when populations become segregated from resources they view as vital (e.g., food, water, power, fuel, cyber, money). If the future of conflict manifests out of a competition for resources, then the military must consider the intelligence preparation of the battlespace (IPB) by defining the populations' critical resource requirements, mapping out the resource-allocation networks and distribution pathways that provide those critical resources, and assessing those networks and pathways for vulnerability. Securing and ensuring the integrity of resource networks and pathways becomes the military's primary responsibility.

Proposed Model for Mapping Predation Intervention Points

Although the SWOC is geographically agnostic in the sense the military's objective is to control resources within the terrain and minimize infrastructure damage to avoid disruptions in the daily operations of the community. IPB requires military and civilian planners to identify critical vulnerabilities that exist in resource-allocation and network distribution pathways as a preventive measure against predation. Using biological science and studies to map predator invasion process, a proposed model to identify military intervention points may prove useful. Table 1 illustrates how physical and biological sciences adapt to complement the SWOC to provide military and civilian planners a proactive method of analyzing the symbiotic and delicate balance between a community's population and resources.

While each predator and community is unique, the qualities of neither the predator nor the population actually serve as the center of gravity in symbiotic warfare. Predators exploit resources and the vulnerabilities that exist in resource allocation and distribution networks and pathways. Neutralizing the threat requires cohesive ef-

forts between the civilian community, metropolitan police forces, and the military. In the SWOC, the military only takes direct action when metropolitan police forces require augmentation or when defending resource-allocation networks and distribution pathways. Thus, the identification of intervention points proves useful for military planners who seek to commit military assets and capabilities to assist in predation neutralization.

Differences between Symbiotic Warfare and Insurgency

Counterinsurgency defines an insurgency as "the organized use of subversion and violence to seize, nullify, or challenge political control of a region."[66] The SWOC adopts a similar definition for its use of the term *predator*, delineating insurgents from predators primarily by their objective. For example, in an insurgency, the insurgent uses "a mixture of subversion, sabotage, political, economic, psychological actions, and armed conflict to achieve its political aims."[67] Predators, which also use a mixture of subversion, sabotage, political, economic, psychological, and armed conflict, seek to control or exploit resources. The predator's objective is not political by nature. Furthermore, the hearts and minds of the population is not an objective for predators or for a military, which is charged with assisting a community in neutralizing a predation threat. Predators use the population as maneuver space to gain access to resources. Military planners must determine where populations are most vulnerable to help the community determine where predators may temporary nest.

The SWOC also adopts several concepts from COIN doctrine. For example, similar to COIN, symbiotic warfare is a comprehensive civilian and military effort designed to neutralize predators and address the root causes of resource instability that led to predation.[68] Similarly, symbiotic warfare is population centric. The development of proper symbiotic warfare tactics starts with the acceptance of the

[66] *Counterinsurgency*, I-1.
[67] *Counterinsurgency*, I-1.
[68] By definition, "COIN is a comprehensive civilian and military effort designed to simultaneously defeat and contain insurgency and addresses its root causes." *Counterinsurgency*, I-1.

Table 1. Mapping predation intervention points

Invasion process	Mitigation strategy	Resources	Native population	Predator
Species in vector/pathway	Prevention and interception	Identify allocation networks and distribution pathways	Identify vulnerable population	Identify resource requirement
Insertion	Early detection	Monitor allocation networks and distribution pathways	Monitor vulnerable population	Identify resource exploitation networks
Population established*	Rapid response	Secure allocation networks and distribution pathways	Monitor for sign of predation; segregate population from broken networks and pathways	Eradicate predator's resources
Spread/dispersal*	Containment and neutralization	Monitor allocation networks and distribution pathways	Monitor for signs of predation; segregate population from broken networks and pathways	Segregate
Ecosystem infrastructure and competing population damage*	Restabilization and restoration	Repair damage to infrastructure; strengthen vulnerability	Reintegration	Eliminate

* Dependent on the ecosystem community's adaptive capacity and the robustness of its resources.

Source: Adapted from George Marbuah et al., "Economies of Harmful Invasive Species: A Review," *Diversity* 6 (July 2014): 503, https:doi.org/10.3390/d6030500.

population's role in identifying and neutralizing the threat. A metropolitan police force may prove fully capable of securing the population; thus, the military will assume only an enabling and complementary role with capabilities such as intelligence, surveillance, and reconnaissance (ISR) and counter electromagnetic warfare.

Critical Factors in Urban Operations

The factors the SWOC determines critical to urban operations are intelligence, combined arms, and civil military operations. Combined arms break down essential categories of weapons to: 1) offensive and defensive air, sea, and cyber forces; 2) security forces (infantry and SOF); 3) electromagnetic weapons; and 4) nonlethal fires. The SWOC uses the existing infrastructure and resources within the megacity to target and neutralize the threat to the greatest extent possible. Military operations in the support of the SWOC are to fill infrastructure capability and capacity gaps and strengthen the vulnerabilities of networks and pathways that provide resource allocation and distribution.

Offensive and defensive air, sea, and cyber forces require the U.S. military to reassess its current platforms for viability in a megacity environment. For air and cyber assets, the Services could consider using ISR micro air vehicles (MAVs) to swarm and scatter the megacity. Low cost ISR MAVs, using a Lockheed C-130 Hercules as a delivery mechanism, can deploy in an uncontested air space and transfer via flutter, hover, or loiter in a contested air space for up to 10 days.[69] Their less than 1.5-inch profile and light weight allows a C-130 to deploy up to 10,000 MAVs during one air delivery. The uses of ISR MAVs prove critical to monitoring resource-allocation networks and distribution pathways.

Furthermore, the military could also use MAVs to set up virtual command and control (C2) nodes. MAVs equipped with dual transmit capability, similar to ISR MAVs, can also carry a unique IP address. Deploying 10,000 components during one launch not only allows for network and transmit capability for military forces but also reestablishes connectivity after a cyber or electromagnetic attack. To assist in neutralizing predation threats, the military and civilian law enforcement can use network mirror imaging to set up a network noose to track predator movements and transmissions. This also opens the virtual C2 environment to facilitate robust information operations campaigns

[69] Maj David J. Blair, USAF, and Capt Nick Helms, USAF, "The Swarm, the Cloud, and the Importance of Getting There First: What's at Stake in the Remote Aviation Culture Debate," *Air & Space Power Journal* 27, no. 4 (2013): 14–38.

to include those launched by intelligence planners who seek to employ deception tactics.

Fires, while important, play a minor role with IPB planning, MAV ISR, and virtual C2 nodes. While small diameter bombs may prove precise, it is important to remember that the concept of symbiotic warfare is to minimize disruption to infrastructure within a megacity, especially to resource-allocation networks and distribution pathways that the predators themselves will seek to exploit.

Capability Assessment

Today's Joint Force cannot meet the challenges of megacity warfare. While *Military Operations on Urbanized Terrain* and *Joint Urban Operations* are starting points for doctrine reassessment, capabilities require a technology refresh if the Joint Force wants to remain impervious and invulnerable while defending, securing, and protecting a megacity's resource-allocation networks and distribution pathways. The purpose of the capability assessment is not to seduce the Joint Force with technology but to counter twenty-first century technological threats that leave megacity resources and communities vulnerable to predation.

Regarding potential threats that leave resource-allocation networks and distribution pathways vulnerable, the SWOC recommends developing the following capabilities and tactics. Rethinking how the Joint Force uses its current capabilities and tactics could not come at a more relevant time. The lag time in acquisition and proper research, testing, development, and evaluation places 2019 as the right time to consider 2025's future needs. The following is a list of current capability, platform, and concept shortfalls:

- Capabilities
  - Terrain and subterranean loiter, hover, and flutter ISR
  - Terrain and subterranean counterelectromagnetic warfare
- Platforms
  - ISR and network-capable MAVs and drones that provide loiter capabilities and those that can flutter, scatter, and swarm to counter an electromagnetic threat, reopen networked lines of communication, provide network noose capabilities to mon-

itor predator activity, and exploit information exchanges for intelligence gathering

- Concepts
  - Virtual "Cloud" C2 to 1) minimize military footprint on a community's resources and 2) remain elusive to predators
  - Scatter, swarm, and disperse tactics to counter an electromagnetic attack and track a predator's capability to use the population as maneuver space [70]

Conclusion

Densely populated and congested environments rely on robust resource-allocation networks and distribution pathways that future agglomerated populations (predators) will attempt to disrupt to exploit resources. The military's future role in megacity warfare is to provide an undisrupted flow of resources to the population to neutralize predation threats. Symbiotic warfare is nothing more than a hybrid of urban warfare, insurgency, and irregular warfare. Based on scientific research and adaptive modeling of how densely populated species behave when predators attempt to exploit resources, symbiotic warfare provides the intelligence community a map of the predation invasion process, affording the military intelligence community the ability to identify points of intervention useful in neutralizing predation threats.

Furthermore, symbiotic warfare, and the follow-on symbiotic warfare operating concept, focuses on the interdependencies that exist between resources, population, and the predators that seek to disrupt the integrity of resource-allocation networks and distribution pathways. Doctrine analysis reveals obvious oversights in these considerations and still relies on fires as a primary means of threat neutralization. If megacity warfare becomes a reality, then the military needs to prepare for it. Current platforms and capabilities, which they deliver, fall short in meeting heavy ISR demands and networking capabilities. Furthermore, the ability of platforms to maneuver freely within

[70] For detailed explanation of "swarm" and "scatter" as tactics to counterelectromagnetic threats, see Blair and Helms, "The Swarm, the Cloud, and the Importance of Getting There First," 14–38.

the megacity do not currently exist. If nothing more, this research provides the military with a sobering reality that future warfare may not require direct action and fires as much as it will require the military to deliver and secure essential services for a population.

CHAPTER ELEVEN

Air Domain Dominance in a Megacity

Major Nathan J. Storm, U.S. Marine Corps

The Japanese landings came on 8 December 1941 in northern Malaya and southern Thailand. By the morning of 10 December, they had penetrated well into the Malayan frontier and advanced to Kedah, Malaysia. Japanese aircraft dealt swiftly with any resistance and eased their progress down the peninsula to threaten Singapore. The Japanese had advanced nearly 1,000 kilometers to capture Malaya in only 54 days. On the night of 8 February, two divisions of the Japanese invasion force crossed the straits and landed on Singapore Island. At the end of the day, more than 30,000 Japanese troops occupied Singapore, establishing a stronghold on the northwestern part of the island. The Japanese advance continued until Allied forces had been driven back to the suburbs of Singapore city. Food and water supplies were low, and that evening British lieutenant general Arthur E. Percival surrendered to the Japanese.

MARINE CORPS AVIATION DOCTRINE AND CAPABILITIES IN A MEGACITY

The future of urban warfare is bleak. The possibility, or probability, of conducting any of the range of military operations inside a dense urban environment is incredibly high. A national security professor at the U.S. Naval War College, Richard J. Norton, certainly expects it, stating that "if three quarters of the world will live in cities, and we still fight

wars, then wars are going to be fought in this environment."[1] With that concept in mind, the Marine Corps must research, develop, and practice new concepts for the conduct of war in a dense urban environment. Current Marine Corps air doctrine and maneuver capabilities are poorly suited for operations within this dense urban environment. For purposes of this project, we will discuss the dense urban environment as a megacity. To understand how to fight in a megacity, we must have a broad definition from which to work. We also must justify our reason for studying war in a megacity environment and determine if current doctrine and tactics suitably account for the vast human network the military will encounter while operating there.

The generally accepted size of a megacity is an urban area with a population greater than 10 million people. The United Nations *2018 Revision of World Urbanization Prospects* (WUP) reports 37 current megacities and predicts 43 by 2030.[2] The WUP continues:

> Today, 55% of the world's population lives in urban areas, a proportion that is expected to increase to 68% by 2050. Projections show that urbanization, the gradual shift in residence of the human population from rural to urban areas, combined with the overall growth of the world's population could add another 2.5 billion people to urban areas by 2050, with close to 90% of this increase taking place in Asia and Africa.[3]

The World Health Organization (WHO) further explains the annual increase in urban population: "The global urban population is expected to grow approximately 1.84% per year between 2015 and 2020, 1.63% per year between 2020 and 2025, and 1.44% per year between 2025 and 2030."[4] Expanding urban populations place more humans at closer proximity to each other than ever before. Close physical prox-

[1] Flavia Krause-Jackson and Nicole Gaouette, "Homemade Tank Powered by Game Boy Fights Wars of Future," *Bloomberg*, 9 September 2014.
[2] *2018 Revision of World Urbanization Prospects* (New York: United Nations, 2018).
[3] *2018 Revision of World Urbanization Prospects*.
[4] "Urban Population Growth," World Health Organization, accessed 17 December, 2014.

imity coupled with increased electronic connectivity yields drastically increased global interconnectedness. During the course of this study, the size of a megacity became irrelevant to our purposes. The key feature became instead population density over absolute size. Gaza is more densely populated than Los Angeles, even with a total population of about 1.8 million people. If our major concern is the interconnectedness of major urban centers, we need not worry about an arbitrarily defined population requirement but that there exists ample opportunity for connections to form within the population.

Mavens and connectors or programmers and switches—no matter what you call them—the people who establish, recruit, train, and run human networks are a major threat. The pool from which recruits are drawn continues to increase as the local, interconnected population size grows. In a networked megacity, the ability to control or regulate those human networks is key. In *The Tipping Point*, Malcolm Gladwell discusses two types of human network facilitators he calls "mavens" and "connectors." Mavens collect information; they have knowledge and want to distribute that knowledge to as wide an audience as possible. To distribute knowledge, mavens enlist help from connectors. According to Gladwell, connectors are important not only for the number of people with whom they are connected but also for the quality of those connections.[5] Noted sociologist Manuel Castells discusses a similar concept in his 2011 article, "A Network Theory of Power." Castells's concepts of "programmers" and "switches" hold similar meaning to Gladwell's mavens and connectors. Castells defines *programmers* as a person or group with "the ability to constitute network(s) and to program/reprogram the network(s) in terms of the goals assigned to the network," and connectors have "the ability to connect and ensure the cooperation of different networks by shaping common goals and combining resources while fending off competition from other networks by setting up strategic cooperation."[6] Mavens and programmers control the knowledge base. They trans-

[5] Malcolm Gladwell, *The Tipping Point: How Little Things Can Make a Big Difference* (New York: Little, Brown, 2000), 30–86.
[6] Manuel Castells, "A Network Theory of Power," *International Journal of Communication*, no. 5 (2011): 776.

fer their knowledge to a close group of followers but need another means to translate that knowledge to a wider audience. Connectors and switches are that means; during a future war in a megacity, the people or groups who facilitate these roles are a key to success in defeating any adversarial group.

Physical and electronic interconnectedness, increasing population density and size, and the power to form, program, and spread networks creates a distinct problem for the Marine Corps with regard to war in a megacity. From an aviation point of view, how does the Marine Corps respond to military operations within a megacity, assuming that control and regulation of physical and electronic network connections are key?

One current military doctrinal publication "recommends isolating and bypassing urban terrain when possible due to the costs involved."[7] Obviously when discussing the future of war in a megacity, bypass and isolation is neither possible nor the best means by which to prosecute the war. To effectively fight in a megacity, the U.S. Marine Corps must be capable of controlling individual networks. Current Marine Corps aviation doctrine seems ill-equipped to function against the interconnected complexities of war in a megacity.

The Marine Corps maintains six aviation functions: electronic warfare (EW), air reconnaissance, offensive air support (OAS), assault support, command of aircraft and missiles, and antiair warfare (AAW).[8] Initial problem framing assessment within the megacity describes problems of aviation maneuver. Problem framing also leads to a cursory list of questions the Marine Corps must parse through. How does the Corps adapt these six functions to operate within a dense urban environment? Similar to ground urban operations, aviation urban operations are fraught with myriad challenges. How does Marine Aviation maneuver safely and effectively within this type of environment? Will the megacity's concentration of electromagnetic radiation affect the capability and effectiveness of EW? How will urban canalization affect the assault support aircraft's mission of airborne movement of equip-

[7] *MTTP for Aviation Urban Operations*, MCRP 3-35.3A (Quantico, VA: Marine Corps Combat Development Command, 2001), I-1.

[8] *Aviation Operations*, MCWP 3-2 (Quantico, VA: Marine Corps Combat Development Command, 2000), 2-1–2-6.

ment and personnel? Will the vertical nature of most megacities interfere with OAS and air reconnaissance's ability to locate, target, and prosecute the enemy without high collateral damage risk? Without adaptation of procedures and capabilities, limited line of sight affects positive command and control of aircraft within a megacity. How will the megacity affect the Marine Corps' ability to conduct AAW? The asymmetric nature of urban combat affects every aspect of Marine Aviation.

MTTP for Aviation Urban Operations speaks in very broad terms about considerations for military aviation operations in an urban environment, but notably does not discuss the interconnected nature of urban warfare. *Joint Urban Operations* more appropriately discusses the interconnectedness of a megacity "as a complex and dynamic system, with unique political, military, economic, social, information, and infrastructure (PMESII) and other components. Each element impacts, constrains, and influences military operations."[9] *Joint Urban Operations* continues to discuss "complex social and political interactions by compressing large numbers of people into a small geographic area. Critical infrastructures (physical, economic, governmental, social, etc.) are in such close proximity and, in most areas, so intertwined that even minor disruptions by military operations can cause significant repercussions."[10] It also covers aviation operations, stating that "air operations must adapt to the unique urban environment . . . although [command and control] C2 does not change in the urban environment, tactics, techniques, and procedures (TTP) may be vastly different from those employed on the open battlefield."[11] The Marine Corps must cooperate with the joint community to research and deploy new techniques and technology suitable to a megacity.

One key to success in megacity warfare is creating and adapting TTPs to the megacity environment. The Marine Corps also must develop new means of conducting urban aviation operations to include airborne, nontraditional intelligence, surveillance, and reconnais-

[9] *Joint Urban Operations*, JP 3-06 (Washington, DC: Chairman of the Joint Chiefs of Staff, 2013), I-2.
[10] *Joint Urban Operations*, I-2–I-3.
[11] *Joint Urban Operations*, I-9.

sance (NTISR); and assault support and offensive air support (OAS). With regard to NTISR and OAS, the traditional top-down approach will likely not be as effective in an urban environment because of the vertical characteristics of a modern megacity. Assault support TTPs also may need to be adjusted, especially in light of the probability of aircraft operating below the building horizon and limitations on current aircraft survivability equipment (ASE).

Additional aviation considerations include impacts to aircraft systems, such as forward-looking infrared (FLIR) radar and night vision devices (NVD). For example, thermal reflectivity precludes FLIR systems from being able to see through glass. Glass has high thermal reflectivity and will reflect the thermal energy of the background.[12] The *Marine Aviation Weapons and Tactics Squadron 1 (MAWTS-1) Night Vision Device (NVD) Manual* continues: "Certain smooth, glossy surfaces, such as . . . windshields and glossy painted fenders can reflect [infrared] IR radiation images incident on them from other sources."[13] Glass-fronted buildings dominate the modern cityscape, thereby making them opaque to modern aviation thermal imaging devices.

The nighttime urban environment has similarly negative effects on NVDs. Current advances in the Marine Corps night vision goggle device, the AN/AVS-9 with OMNI-VI image intensifier tubes, have reduced halo effect around non-NVD compatible lights (typical white, yellow, red city lights are non-NVD compatible).[14] Improved image intensifier tubes cannot account for the increased visual clutter and reflected light that negatively affect the devices. Decreased visual acuity increases the risk associated with flying in the urban environment and creates significant difficulty with locating, tracking, and operating against individuals who control urban networks.

To effectively operate in the megacity environment, the Marine Corps must research, study, and experiment with new and existing

[12] *MAWTS-1 Night Vision Device (NVD) Manual*, 9th ed. (Yuma, AZ: Marine Aviation Weapons and Tactics Squadron 1, Marine Corps, 2011), 26, hereafter *MAWTS-1 NVD Manual*.
[13] *MAWTS-1 NVD Manual*, 28.
[14] LCdr Heath Clifford, USN, "NVD Technology Update" (presentation, MAWTS-1, Yuma, AZ, 10 November 2014).

concepts to develop appropriate TTPs and equipment. Current capabilities are more well suited to warfare in the open environments in Iraq and Afghanistan. Current satellites and unmanned aircraft systems are poorly equipped to gather intelligence in the narrow streets of a megacity. To facilitate future success, the Marine Corps must recognize these limitations and develop new methods of locating, tracking, and controlling megacity network programmers and switches.

Before developing a concept for the future of Marine Corps Aviation in a megacity, this chapter will discuss how to develop a more thorough understanding of the problems related to war in megacities. The following case study of the Japanese invasion of the Malay Peninsula and Singapore during WWII develops one perspective of apparent issues of megacity war.

CASE STUDY: JAPANESE INVASION OF SINGAPORE DURING WWII

Japan's first offensive in the Pacific war against the West actually was not the attack on Pearl Harbor. About 20 hours before the Japanese attack on Oahu, Hawaii, five Imperial Japanese Army fighters took off from Thailand to support a convoy in the Gulf of Siam. During their flight, the fighters happened upon a British Royal Air Force (RAF) Consolidated PBY Catalina patrol flying boat. The amphibious aircraft, based out of Singapore, was searching for the convoy those Japanese fighters were meant to support. The Japanese fighters vastly outmatched the sluggish boat-plane and destroyed the Catalina before it could radio back to its headquarters in Singapore.[15] And so began the war in the Pacific, Japan's conquest of the Malay Peninsula, and their eventual seizure of Singapore.

Initially, one might look to a 76-year-old battle in the Pacific and think it of little significance to a discussion of twenty-first-century warfare or, more specifically, to war in a megacity. The Marine Corps Doctrinal Publication (MCDP) *Warfighting* extols the "two concepts of universal significance in generating combat power: speed and fo-

[15] Stanley L. Falk, *Seventy Days to Singapore: Malayan Campaign, 1941–42* (New York: G.P. Putnam's Sons, 1975), 16.

cus."[16] It is this speed and focus that led the Japanese to dominance during their multimodal and multidomain assault on the Malay Peninsula and Singapore. Japan's air and sea power dominated in the face of a numerically superior British occupation and established defense. Through the next few pages, we will briefly frame a discussion of the battle and the operational planning for both the Japanese and British. Finally, we will discuss overall findings from the case study and how we can relate this operation to war in a megacity and the concepts to come.

The method of research for this case study was through internet searches, online research databases, written histories, and theoretical works. The intent of this work is to develop a link between the military necessity of gaining and maintaining rapid domain dominance within an urban environment, such as Singapore in 1941, and the capacity to gain the same dominance in a modern megacity environment. To this end, the research for this chapter was primarily concerned with the historical narrative regarding Japan's domination of the Malay Peninsula, followed by the seizure of the island and city of Singapore. The modern commander may find the best way to gain control of a megacity is through the valuable lesson of the rapid multimodal dominance the Japanese achieved in Singapore.

HISTORICAL BACKGROUND

To continue their offensive in China, the Japanese needed access to natural resources they could not otherwise procure in the open markets. The economic sanctions placed on Japan worked to strangle the nascent Japanese empire.[17] Forced to look for war materials elsewhere, Japan looked to the south for relief to "seize for herself the mineral-rich resources of South-east Asia."[18] At approximately 0215 on 8 December 1941, a little more than an hour before the attack on Pearl

[16] *Warfighting*, 40.
[17] Falk, *Seventy Days to Singapore*, 19.
[18] Falk, *Seventy Days to Singapore*, 19.

Harbor, the initial Japanese invasion force in Malaysia landed.[19] During the next few hours, the Japanese brought three divisions ashore in Thailand while holding another division in reserve.[20] Using what one must assume to be deceptive tactics, the Japanese leadership in Thailand "completed [formalities] allowing us to pass through Thailand."[21]

The British forces in Singapore and throughout the Malay Peninsula had accurate intelligence regarding the impending Japanese assault. However, the general understanding and analysis of that intelligence was that the Japanese Army was attacking Thailand and not the British in Singapore.[22] The British also recognized the difficulty of defending against a Japanese assault into neutral Thailand's sovereign borders. British forces crossing Thailand's border to defend Malaysia and Singapore against the Japanese offense would likely paint the British as the aggressor.[23]

In the introduction to Arthur Swinson's book *Defeat in Malaya: The Fall of Singapore*, Sir Basil Liddell Hart describes the defending British force as having "more than sufficient strength in the island to repel the invasion, particularly as it came in the sector where it was most expected."[24] Under Lieutenant General Arthur Percival, Malaya Command, the British command in Singapore totaled approximately 88,600 troops. Troop breakdown in Malaya Command included 37,000 Indian troops, 19,600 British, 15,200 Australians, and 16,800 Malayan and Chinese troops. The Indians were broken down into two divisional commands and the Australians had one. The British troops had no division command but were broken into six battalion commands. Percival commanded a weak air force of 158 operational aircraft made up primarily of obsolete models operated by underprepared pilots who

[19] Yap Siang Yong et al., *Fortress Singapore: The Battlefield Guide* (Singapore: Times Books International, 1992), 10.
[20] Falk, *Seventy Days to Singapore*, 31.
[21] Arthur Swinson, *Defeat in Malaya: The Fall of Singapore* (New York: Ballantine, 1970), 51.
[22] Swinson, *Defeat in Malaya*, 51.
[23] Brian P. Farrell, "High Command, Irregular Forces, and Defending Malaya, 1941–1942," *Global War Studies* 8, no. 2 (December 2011): 46–47, https://doi.org/10.5893/19498489.08.02.02.
[24] Swinson, *Defeat in Malaya*, 7.

had not seen combat. Finally, the Royal Navy in Singapore included aircraft carrier HMS *Hermes* (95), battlecruiser HMS *Repulse* (1916), battleship HMS *Prince of Wales* (53), and a few smaller ships.[25]

The approximate total Japanese force brought to bear against the Malay Peninsula and Singapore was roughly matched with the British forces in the area. Japanese forces included approximately 50,000 infantry, 80 medium and 100 light tanks, a strong artillery presence, and various support elements (engineers to support bridging operations) totaling an additional 30,000 troops. The Japanese force came in with more than 450 aircraft and a strong naval presence of cruisers, destroyers, and submarines.[26]

ANALYSIS

So how did a numerically inferior force (~80,000 Japanese to ~88,600 Allied) push one of the world's great powers south along the length of the Malay Peninsula and eventually rout them in Singapore? Herein lies the heart of what this chapter looks to discover. The superior Japanese planning, strategy, and execution kept the British forces continuously off balance and in an almost constant state of withdrawal.

Similar to the numbered war plans the United States maintains, Japan built a specific war plan against the strategically important island of Singapore. To use the parlance of our times, the operational planning team (OPT) leader was Lieutenant Colonel Masanobu Tsuji.[27] Though not specifically trained in amphibious operations or jungle warfare, the Japanese embarked on a crash course. The Japanese planners sought information regarding the tropics from any source they could imagine, including "pestering sea captains, mining engineers, bankers, university professors, diplomats, Buddhist priests—in short, anyone and everyone in Japan and Formosa who knew anything at all about the tropics."[28] For the Japanese troops to prepare for the assault through Malaysia, they conducted regional exercises through-

[25] Falk, *Seventy Days to Singapore*, 53–57.
[26] Falk, *Seventy Days to Singapore*, 28.
[27] Falk, *Seventy Days to Singapore*, 24.
[28] Falk, *Seventy Days to Singapore*, 25.

out the spring of 1941, allowing the army and navy to build interoperability and amphibious experience.[29] Tsuji and his planners personally conducted ground and aerial reconnaissance of the Malay Peninsula and potential landing beaches.[30] With detailed planning, reconnaissance, and multiple rehearsals, the OPT ensured every opportunity for Japanese success in Singapore. Japanese leadership recognized the strategic importance of Singapore and the necessity for Japanese control over Singapore while conducting the Pacific campaign. With this recognition came long-term and deliberate planning that ultimately led to their success.

Political forces at home in London hampered British defenses in Singapore with poor local tactical decisions. In his book *Operation Matador*, Ong Chit Chung argues that much of the fault for Singapore's fall to the Japanese lay with Winston Churchill. Churchill's attention was with the more immediate war on the European continent than with the much farther afield defense of Singapore. The thinking in London was that Japan might invade Thailand, but certainly would not risk war with the Western powers.[31] Furthermore, Churchill generally believed that Japan was not on the verge of war with the West—given their preoccupation in China—and that the best defense of Singapore was through "strong local garrison and the general potentialities of sea-power. The idea of trying to defend the Malay Peninsula and of holding the whole of Malaya . . . cannot be entertained."[32] Churchill's views delayed arrival of the capital ships *Repulse* and *Prince of Wales* (ill-fated as their arrival may have been). Theorists often quote Clausewitz's definition "that war is not merely an act of policy but a true political instrument,

[29] Henry Frei, *Guns of February: Ordinary Japanese Soldier's Views of the Malayan Campaign & the Fall of Singapore, 1941–42* (Singapore: Singapore University Press, 2004), 31.
[30] Falk, *Seventy Days to Singapore*, 26–27.
[31] Operation Matador was the plan by the British Malaya Command to move forces into place to counter a Japanese assault. Ong Chit Chung, *Operation Matador: Britain's War Plans against the Japanese, 1918–1941* (Singapore: Times Academic Press, 1997), 222–23.
[32] Winston S. Churchill, *Their Finest Hour*, vol. II, *The Second World War* (Boston: Houghton Mifflin, 1949), 667–68.

a continuation of political intercourse, carried on with other means."[33] However, in this case, the converse is true. The politicians in Britain, far from pursuing war in Singapore, found a war in Southeast Asia at least partially because of their political inaction. British unwillingness to initiate Operation Matador, because they feared being seen as the aggressor in Thailand, did not help the defense of Singapore.[34] Nor did the quick demise of the *Repulse* and *Prince of Wales* or the modest (at best) northern defense in Singapore assist in the ultimate success of the British.

The Japanese fought south quickly. Upon the initial assault, their priority was air supremacy. Japanese air forces destroyed British aviation units and, upon seizure of British-held airfields, extended the range of Japanese aircraft farther south. Once satisfied they had attained air supremacy, the Japanese would speed their southward advance toward Singapore.[35] Speed was of the utmost importance to the Japanese. Brian P. Farrell, head of the history department at the National University of Singapore, writes that "the British expected the Japanese to consolidate a beachhead, build up their strength, advance only when their main force was concentrated, then advance methodically."[36] Farrell points to the success of their strategy:

> Within 100 hours they shattered all British defensive plans, seized the initiative, and advanced boldly into northern Malaya. Force Z sortied, but was caught at sea by Japanese land-based naval air forces and destroyed on the morning of 10 December. This, plus the Japanese success at Pearl Harbor, gave the [Imperial Japanese Navy] IJN command of the sea. That allowed it to threaten the whole east coast. This forced Malaya Command to keep much of its strength in southern Malaya and on Singapore Island. [Royal Air Force] RAF Far East gave battle, but was outmatched in every respect. Losing nearly half its strength in three days, the

[33] Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976, 1984), 87.
[34] Chung, *Operation Matador*, 232–33.
[35] Falk, *Seventy Days to Singapore*, 31.
[36] Farrell, "High Command, Irregular Forces, and Defending Malaya," 47.

air force drew back to regroup and try to protect reinforcement convoys approaching Singapore; this left the army vulnerable.[37]

Contrary to British expectations, the majority of Japanese land forces flowed like water to the western coast of the Malay Peninsula then south to arrive at the Johor Strait by the first week of February 1942. Sun Tzu describes the necessity of speed as "the essence of war. Take advantage of the enemy's unpreparedness; travel by unexpected routes and strike him where he has taken no precautions."[38] Japanese forces succeeded in that paradigm. As mentioned above, the Japanese land-based naval air forces destroyed the British "Force Z" (the capital ships *Repulse* and *Prince of Wales*), leaving the peninsula unguarded at sea. Japanese air forces also destroyed virtually all of the British aviation capability on the Malay Peninsula and in Singapore. The rapidity of the attack by the Japanese kept the British defense off balance and negated the numerical superiority the British enjoyed.

The battle raged the length of the peninsula and, by the end of January, the British forces had retreated back across the causeway onto Singapore Island. On the morning of 31 January 1942 at approximately 0815, the British forces destroyed the causeway and prepared for a final defensive stand in Singapore.[39] On 8 February 1942, the Japanese arrived at the Johor Strait, began an amphibious assault on Singapore, and by the morning of 9 February had two divisions of infantry and portions of their heavy machinery across the strait. The Japanese continued to push the British forces back toward Singapore and, by 12 February, the Japanese controlled the reservoirs that fed water to the city. The British forces surrendered in the early afternoon of 15 February 1942.[40]

[37] Farrell, "High Command, Irregular Forces, and Defending Malaya," 49.
[38] Sun Tzu, *The Art of War*, trans. Samuel B. Griffith (New York: Oxford University Press, 1971), 134.
[39] Louis Allen, *Singapore, 1941–1942* (Oxford: Frank Cass, 2005), 160.
[40] Allen, *Singapore*, 169–74.

INFERENCES

The question now is how to correlate these lessons learned from Japan's successful assault of the Malay Peninsula and Singapore to the future of warfare in a megacity. We will condense the above pages to a few findings that provide a glance at a theory of victory. First, we want to look at the importance of intelligence gathering, analysis, and planning processes, then discuss the influence of speed, surprise, maneuver, and multidomain dominance as these subjects relate to military operations in a megacity.

Military theorist Sun Tzu describes the need to conduct planning so that one may "know the enemy and know yourself; in a hundred battles you will never be in peril."[41] The Japanese forces were well prepared for the operation to capture Singapore. They gathered intelligence, built their plan based solidly on intelligence estimates, and rehearsed their concept. To be victorious in a future megacity war, the United States military must be equally prepared. Preparation must entail detailed studies of how conflict in a megacity would present. War in an urban environment is exceedingly complex, even more so because each megacity has a unique character, culture, and environment. A one-size-fits-all approach cannot work (at least not efficiently). To be successful, the U.S. military must fully understand the requirements and the environment to develop tactics, techniques, and procedures (TTPs) by which to gather operable intelligence in the networked environment of a megacity and subsequently attack targets that support those networks.

Clausewitz describes the value of speed and surprise in his treatise *On War* as "the means to gain superiority."[42] The Japanese did not have numerical superiority so they maximized their use of speed and surprise. Conversely, the British forces on the Malay Peninsula had neither surprise nor initiative. Though Operation Matador could have influenced the outcome of the 70 days between the invasion and the surrounding of Singapore, the authorization to initiate Matador did

[41] Sun Tzu, *The Art of War*, 84.
[42] Clausewitz, *On War*, 198.

not arrive until 5 December 1941.[43] The Japanese rapid ingress across the beach and south through the peninsula evidenced no sacrifice of speed and initiative. As such, the Japanese had little requirement to build up forces in the traditional sense. Similar to Sir Julian S. Corbett's sea power theory, Japanese speed and surprise without loss of initiative created a sort of mass in being.[44] This is not to say that they did not mass their forces—they certainly did. The speed with which the Japanese moved gave a semblance of mass that provided maneuver space while their forces continued to flow ashore.

The Japanese forces quickly captured and controlled critical infrastructure on the island of Singapore that contributed to the British surrender. As mentioned, on 12 February, Japanese forces controlled the water reservoirs that supplied Singapore. Though the Japanese did not halt water service to the city, they certainly had the capability. Controlling this key infrastructure and service must have had some influence on the British surrender.

The most important finding of this case study is the speed with which Japan gained multidomain dominance across the length of the peninsula and the surrounding waters. Though the British ineffective defense was partially due to political decision making in London, the reality was that the Japanese quickly marched south along the peninsula and dominated nearly the entire way. Only a few hours after the initial amphibious landing in the north, Japanese bombers completed their first bombing raid on Singapore. Though there was little significant damage, the raid set the tone for the remainder of the Japanese push south.[45] Still, on 8 December, the Japanese air forces reduced British air strength in the northern parts of the peninsula from 110 operational aircraft to 50.[46] Japanese air supremacy over the entirety of the peninsula and Singapore soon followed. Similarly, the Japanese attained domination of the seas surrounding the Malay Peninsula and

[43] Allen, *Singapore*, 99.
[44] Julian S. Corbett, *Principles of Maritime Strategy* (Mineola, NY: Dover Publications, 2004).
[45] Swinson, *Defeat in Malaya*, 52.
[46] Swinson, *Defeat in Malaya*, 55.

Singapore almost as soon as the British capital ships arrived. By the afternoon of 10 December, both British ships were lost and Japan had control of the sea lines of communication. On 14 February, the Japanese completed repairs to the destroyed causeway across the Johor Strait, adding one more layer to the Japanese area of domination.[47] The Japanese now controlled air, sea, and ground access to Singapore. The British subsequently surrendered on 15 February 1942. One can surmise that multidomain supremacy allows the freedom of maneuver to be ultimately successful.

Conclusion

Though this chapter did not discuss the operation in intricate detail, the premise is easy to comprehend. Japan's thorough planning allowed their army and navy to dominate the Malay Peninsula and Singapore. Nested within their theory of victory was the rapid multidomain control they enjoyed in both the skies above and the seas around Singapore. But if we return to our earlier question, how does this case study affect our comprehension of future war in a megacity?

One way we can look to build and maintain speed and initiative in a megacity is through acquiring domain dominance. The air domain is of particular interest because current doctrine and capabilities do not lend themselves to successful operations within a megacity's environment. Singapore was initially under total military control by the British, making it easy for the Japanese to gather intelligence and select targets. It is unlikely that a modern megacity will be completely controlled by some group, therefore intelligence gathering, targeting, and fires become infinitely more difficult. Indiscriminate bombing (or even precise targeting that ends in a destroyed building) will likely further the enemy's cause and enrage the local populace. The military must look to other means to create this domain dominance and one such possibility is the use of unmanned aerial systems, micro air vehicles, and systems and techniques that have yet to be developed.

[47] Allen, *Singapore*, 174.

FUTURE CONCEPT: HOW UNMANNED AIRCRAFT SYSTEMS SUPPORT MEGACITY WARFARE

General Purpose

The United States military will fight in a megacity. The question is not if but when. Richard Norton, professor of national security at the U.S. Naval War College, states specifically that "if three quarters of the world will live in cities, and we still fight wars, wars are going to be fought in this [urban/city/megacity] environment."[48] The general purpose of this concept is to describe a paradigm shift for Marine Corps Aviation and implementation of airpower within a megacity environment. Siege warfare is neither feasible nor appropriate for combating an adversary within a megacity. National resolve would likely not be such that the public would willingly ignore the plight of the millions of noncombatants within a besieged megacity. The U.S. Marine Corps must be able to capture the initiative through rapid multimodal, multidomain dominance of specific areas within a megacity. Multimodal and multidomain supremacy describes the ability of the operational force within a megacity to control the air, land, and potentially water within an area via multiple means. The multiple modes of dominance include ground forces, air power, sea power, and cyber capabilities. Major Jonathan T. Frerichs writes of the need to "gain critical maneuver space for the commander."[49] To support the commander, Marine Corps Aviation should change its theory of victory to provide support within a megacity. In order to support the commander, Marine Corps Aviation should diversify its capabilities through greater use of unmanned aircraft systems. These systems should be able to operate independently as well as in concert with traditional manned aircraft. This concept may offer specific means by which the Marine Corps can add capability within the air combat element (ACE) to better support the ground combat element (GCE) commander.

Based on previous problem framing and case study analysis re-

[48] Krause-Jackson and Gaouette, "Homemade Tank Powered by Game Boy Fights Wars of Future."

[49] Jonathan Frerichs, "Maneuvering in a Megacity: Case Study of Grozny and Medellin" (unpublished manuscript, 17 November 2014).

garding the question of megacity war, the following concept is offered as one possible solution. The concept represents a narrow view of the defined problems and case study findings. Earlier problem framing describes issues related to aviation doctrine, maneuver, and sensor technology. The concept references these problems in the discussion. The previous case study of the Japanese invasion of Singapore yielded several findings regarding speed, key terrain, and multidomain dominance based on the air domain specifically and ways by which remote and autonomous technologies can assist Marine Corps Aviation to become more flexible and efficient.

Time Horizon and Risks

Imagine an increasingly bold and ambitious Boko Haram striking far to the southwest of their current territory in Borno, Nigeria. Imagine this group rapidly moving through Nigeria and establishing a foothold within Lagos, Nigeria. Lagos, the largest city in Africa and 19th largest in the world, has an urban population of about 13 million people.[50] Regardless of the likelihood, the time horizon for the requirement to operate within a megacity environment is, for all intents and purposes, now. By and large, the technology the Marine Corps needs to facilitate nontraditional intelligence, surveillance, and reconnaissance (NT-ISR), targeting, and fires within a megacity already exists. Microair vehicles (MAVs), unmanned aircraft systems (UASs), and remotely piloted vehicles (RPVs) already exist within the military's inventory.[51] RPVs are what we generally think of as drones and are a subset of UASs. A true UAS does not require human interaction beyond the planning phase because the aircraft autonomously flies its mission, while a pilot or controller "flies" an RPV through all stages of flight. British armed forces currently use similar small air vehicles in an unarmed role.[52] However, the Marine Corps should develop creative doctrine for their use. Swarming, preprogrammed, or autonomous vehicles can add great flexibility with which the ACE can provide ISR and targeting capability

[50] *2018 Revision of World Population Prospects*, 26.

[51] For purposes of this chapter, the term *small air vehicles* describes the multiple types of aircraft within the scope of MAVs, UASs, and RPVs.

[52] "The UK's Unmanned Roadmap," *Military Technology* 37, no. 12 (December 2013): 76.

that traditional rotary- and fixed-wing aviation cannot provide within a megacity.[53]

Military Problem

To be successful in any operation, a military force must gain and maintain the initiative and domain dominance through speed and surprise. Marine Corps Aviation faces several problems within this concept of victory in a megacity or an extremely dense urban environment. With current TTPs and capabilities, none of these problems are insurmountable, but future adaptations and creative solutions will make victory easier for the Marine Corps. An easier and faster victory with less collateral damage is an obvious benefit. If military operations in a megacity affect fewer noncombatant lives and property, noncombatants are less likely to be aggrieved and thus less likely to take up arms against friendly forces. Some major military problems facing Marine Corps Aviation units fighting in a megacity are:

- Maneuverability in the confines of a megacity
  - Threat envelopes and reaction time. For instance, the RPG-75 has an approximate range of 200 meters against a moving target. The rocket fires at 189 meters per second (m/s) (in excess of 400 mph) and flies approximately 3–6 seconds before self-destruction.[54] The SA-7B "Grail" has a 5 kilometer range, flying at nearly 385m/s (in excess of 800 mph).[55] The ability to see and react to a system like these is limited within the urban environment due to the canalization if flying below the top of buildings or from reduced identification and reaction time because of the distractions created within the urban environment (e.g., sun reflecting off glass, lights, etc.).
- ISR capability
  - Viewing angle of traditional ISR and NT-ISR platforms.

[53] Joe Pappalardo, "The Drones of the Future Will Work in Flocks," *Popular Mechanics*, 23 January 2015.
[54] "Infantry Weapons: RPG-75 Light Anti-Armor Weapon," Jane's Online, accessed 4 March 2015.
[55] "Air-Launched: 9M32 Strela-2 (SA-7 'Grail')," Jane's Online, accessed 4 March 2015.

For example, it is difficult to see into a building using traditional ISR tools such as a geosynchronous satellite stationed 23,000 miles above the battlespace.[56] Other traditional ISR tools like fixed-wing aircraft and drones have similar limitations. Unlike traditional and nontraditional ISR platforms, small air vehicles can fly level with the target upon which they are attempting to gather information.

- Optical sensor capability
  - Night vision devices (NVD), such as infrared cameras.
- Ability to attack specific targets with little or no collateral damage to surrounding spaces

In the next few sections, this chapter matches the above military problems with potential solutions, new technology, and recommended tactical employment changes. These solutions consider the findings gleaned from a recent case study of the Japanese invasion of Singapore in 1941.

Concept Overview

The Japanese invasion of Singapore case study provides several pertinent findings. The Japanese were able to overwhelm the massed British forces by creating the semblance of a mass of their own, though the Japanese traded consolidated mass for the ability to maneuver quickly. The Japanese also maintained dominance in multiple domains—land, air, and sea. By dominating these areas and controlling key infrastructure, the Japanese were able to overwhelm the British defenses on Singapore and capture the island. This concept seeks to answer the question of how the Marine Corps can take those lessons of multiple domain supremacy, speed, and mass to impact the future of warfare in the modern, dense urban environment. The concept specifically focuses on the air domain in and above the city.

[56] Loren B. Thompson, *U.S. Air Dominance in a Fiscally Constrained Environment: Defining Paths to the Future* (Arlington, VA: Lexington Institute, 2013).

The Marine Corps set out a vision of distributed operations in the *Expeditionary Force 21*.[57] To support the operational intent found there, the Marine Corps should entertain creative solutions for operations within a megacity. This concept entails use of UAS, MAV, and RPV systems to augment traditionally piloted aircraft. This concept's operating theme requires the coordinated operation of traditional aircraft and small air vehicles. To support this concept, small air vehicles can assist the commander in three distinct ways: 1) flying in concert/close proximity to traditional aircraft in support of the mission; 2) providing real-time NT-ISR capability; and 3) supporting attack and assault support aircraft by providing close air support or NT-ISR support to close air support aircraft.

The Marine Corps creates opportunity for the ground commander by exploring the collection of capabilities created by development of modern technologies such as small air vehicles. As explained below, small air vehicles provide an opportunity for the ground commander to increase his ISR collection, to expand assault support missions, and to reduce collateral damage while destroying point targets.

Application and Integration of Military Functions

Maneuverability

As previously discussed, the dense urban terrain of a megacity restricts maneuverability for traditional UAS and aircraft systems. To maintain sufficient reaction time to enemy threat systems, aircraft must fly above the urban horizon. Ensuring traditional aircraft fly above the cityscape allows additional time for aircraft survivability systems (ASE) and aircrew to react to enemy weapons systems. The ubiquitous RPG supports this argument. With a 200–400m range, traveling at approximately 400mph, aircraft have about 2.1 seconds to react. Reaction time within an urban environment is complicated further by buildings (if flying in or near an urban center) and the ability to identify the threat against the background clutter. Though they likely would not have substantial ASE, smaller air vehicles are less expensive in both

[57] *Expeditionary Force 21: Forward and Ready—Now and in the Future* (Washington, DC: Headquarters Marine Corps, 2014), 11.

monetary and human capital, thus their loss is more easily accepted. Small air vehicles are not limited by ASE requirements, therefore they can maneuver in an urban environment in unprecedented ways. The flexibility small air vehicles provide to aviation maneuver yields better information to the commander and opportunities for manned aircraft to perform tasks to which they are better suited.

The Marine Corps describes both need and method for distributed operations using the Lockheed Martin F-35 Lightning II program (or Joint Strike Fighter) and other elements of the Marine Air-Ground Task Force (MAGTF). The 2015 "Marine Corps Aviation Plan" defines distributed short take-off, vertical landing (STOVL) operations (DSO) as:

> A threat-based limited objective operation which occurs primarily when the entire MAGTF cannot be brought to bear against the enemy. DSO asymmetrically moves inside of the enemy targeting cycle by using multiple mobile forward arming and refueling points (M-FARPs). Using existing infrastructure (multi-lane roads, small airfields, damaged main bases), DSO provides strategic depth and operational resiliency to the joint force.[58]

Using small air vehicles in addition to current traditional platforms will allow the MAGTF greater flexibility in conducting DSOs. Small air vehicles support DSO from a logistical perspective and a close air support perspective.

Logistical Support of DSO

Platforms such as the Lockheed Martin/Kaman K-MAX power lift helicopter could provide the MAGTF greater flexibility while reducing requirements for traditional aircraft conducting logistics missions. The Marine Corps used two K-MAX aircraft in Afghanistan in 2011 to great acclaim.[59] The K-MAX could increase ability to conduct DSO

[58] "Marine Corps Aviation Plan, 2015" (presentation, Headquarters Marine Corps, 2015), 2.3.

[59] Mike McCarthy, "Post Afghanistan: What's Next for Marines' K-MAX and Unmanned Cargo Supply?," *Defense Daily* 258, no. 24 (May 2013): 10.

with fewer logistical requirements on other MAGTF aircraft that may be needed for more sensitive missions. By July 2014, however, the Marine Corps decided they were no longer necessary to operations in Afghanistan and the K-MAX program ended.[60] K-MAX, or a similar system, can easily conduct logistical support to DSO by ferrying fuel or armament to specified M-FARP locations. Using K-MAX in addition to Sikorsky CH-53E Super Stallions and Bell Boeing MV-22B Osprey assault support aircraft supports greater flexibility by allowing aviation assets to spread the load across the battlespace without increasing manned mission requirements.

Close Air Support of DSO

A traditional Marine Expeditionary Unit (MEU) deploys with four Bell AH-1 Cobras, two Bell UH-1N Hueys, and six McDonnell Douglas AV-8B Harrier IIs. The F-35B Joint Strike Fighter will replace the Harrier IIs within the next several years. Small air vehicles could provide additional close air support (CAS) capability and flexibility in the conduct of DSO. By conducting the DSO mission with both manned and unmanned CAS systems, the MEU can spread its capabilities more widely.

Integration

Instead of these tools being separated by time, space, and altitude, they fly together to conduct their mission. Small air vehicles flying in close proximity to traditional aircraft creates problems. For instance, no helicopter pilot wants a small air vehicle (regardless of size) flying into the helicopter's rotor systems. A solution to this problem is a proximity signal that prohibits the small air vehicle from coming within a certain distance of the aircraft. If the small air vehicle is "slaved" to the traditional aircraft ("master") and mirrors its flight, all while maintaining a safe distance, the likelihood of a collision should be significantly reduced. Without modifying existing airframes, small air vehicles can be used in the manner they are used today, where the aircraft

[60] Marina Malenic, "K-MAX Ends Afghanistan Deployment, USMC Studies Data," *IHS Jane's 360*, 24 July 2014.

are programmed for the mission at a certain airspeed, altitude, and route. The traditional aircraft simply separate from the unmanned systems by time, space, or altitude. For logistical missions, the traditional means of separation supports the concept but the same method of separation would not realize the same results in conduct of a CAS mission. For the CAS mission, a slave/master relationship between the traditional platform and the small air vehicle would likely provide the best support.

Small air vehicles capable of swarming benefit ground and air commanders. The new requirement will be for additional analysts or information managers for the information swarming air vehicles produce. To translate information produced by swarming drones into actionable intelligence, the intelligence structure within the MAGTF will require modification. Swarming air vehicles also serve to overwhelm enemy defenses.[61] The ultimate goal might be for individual maneuver units as small as squads or fireteams to deploy multiple small air vehicles in support of fire and maneuver.

In August 1997, the Marine Corps Warfighting Laboratory conducted a 12-day experiment at the Marine Corps Air Ground Combat Center in Twentynine Palms, California. The Hunter Warrior Advanced Warfighting Experiment "took a look at enhancing Marine units' effectiveness by utilizing a combination of experimental equipment and new warfighting tactics and techniques." The experiment showed that by mixing traditional capabilities with new technologies a small Marine Corps unit could "provide a forward afloat force with the capability to have an operational effect on a larger, capable foe. Hunter Warrior proved that it can be done, but not by using new technology alone."[62]

ISR and Targeting

Flying above the city restricts a pilot's viewing angle to a relatively vertical line of sight. Top-down angles create a dilemma within the megacity, especially where high-rise buildings dominate the cityscape.

[61] *Remotely Piloted Aircraft Systems in Contested Environments: A Vulnerability Analysis* (Kalkar, Germany: Joint Air Power Competence Centre, 2014), 101.
[62] U.S. Marine Corps, "Findings Released on Hunter Warrior Advanced Warfighting Experiment," press release, 22 August 1997.

Vertical visibility angles limit ISR, targeting, and fires to top-down approaches. In a megacity, top-down ISR allows the analyst access only to what is not obscured by various structures. Similarly, top-down angles limit targeting and fires to rooftops, entire buildings, or open spaces. Destroying entire buildings is unacceptable in a megacity where limiting collateral damage should be a priority. Smaller air vehicles level the visibility angle, allowing greater visual access to previously obscure places. Additionally, small air vehicles can augment current platforms in the megacity environment. Imagine the following scenario: attack helicopters conducting an escort mission deploy a number of swarming MAVs that provide the aircrew with ISR of specific terrain, a route, or objective area. Those MAVs could increase the situational awareness of the escort helicopters by expanding the visual range of the aircrew.[63]

Optical Sensor Capability

As mentioned previously, operations in a dense urban environment have detrimental effects on optical sensors.[64] One possible solution is removing the limitations to these sensors by mounting them on small air vehicles. By mounting a low-light video camera on a small air vehicle, limitations such as thermal reflectivity and the detrimental effects of environmental lighting can be eliminated. Imagine a small air vehicle affixing itself to the outside of a building, allowing a camera to be placed immediately against the outside surface of a window. This theory requires continued advancement of optical sensors and technology. The research does not address battery capacity, but technology exists to allow small drones and MAVs to recharge via prestaged inductive charging stations.[65] Given the accessibility of existing tech-

[63] Norway's Prox Dynamics developed and manufactured a production-quality helicopter "nano air vehicle" called the PD-100 Black Hornet Personal Reconnaissance System. The entire system, including two air vehicles, weighs 1.3 kilograms (km) for a 1.5km video datalink and 25 minutes of flight. "The $40,000 Nano Drone Used by British, German, and Norwegian Army," Droning On, 1 June 2017.

[64] Nathan Storm, "Megacities I: Megacities vs. Aviation Doctrine" (unpublished manuscript, 17 November 2014).

[65] "The New Skysense Indoor and Outdoor Charging Pads Available Now," Skysense, 16 November 2017.

nologies, the Marine Corps should be willing to use them creatively and develop operating concepts with these tools in mind.

Minimizing Collateral Damage

Minimizing collateral damage in a megacity is not only a moral obligation, but it may also be a military imperative. Innocent civilian and noncombatant deaths may encourage noncombatants to take up arms with enemy combatant forces. Reducing collateral damage may reduce the future strength of enemy combatants. One method by which to provide precise fires is through the use of small air vehicles instead of traditional weaponry. One such concept under development by the U.S. Air Force Research Laboratory (USAFRL) and General Dynamics are weaponized small air vehicles capable of attacking a specific person with little or no additional collateral damage.[66] Another technology pursued by the USAFRL is biologically inspired small air vehicles capable of adaptive flight.[67] Using similar technology, local commanders can target or reconnoiter key infrastructure, named areas of interest (NAIs), or numbered targets. These small air vehicles have the ability to enter specific buildings and find the requisite rooms once inside. These small air vehicles can discretely prosecute targets without unnecessary destruction.

These advanced capabilities will not be without a certain level of risk and cost. Any small air vehicle that does not autonomously fly its mission would certainly be at risk of being hacked by an adversary. The informed public likely would not accept a completely autonomous version of a micro air vehicle capable of targeting specific people. Therefore, these vehicles would require authorization from some responsible actor leaving open a window of opportunity in which those vehicles could be hijacked. The financial cost of developing such a product is likely to be relatively high given the current fiscally constrained reality. Militarized micro air vehicles also impart moral, ethical, and public relations costs on the country that uses such technology. It

[66] "US Air Force Flapping Wing Micro Air Vehicle," YouTube, video, 4:32, 16 July 2009.
[67] Team AFRL, "WOW Technologies, BIO Inspired Flight for Micro Air Vehicles," YouTube, video, 1:38, 28 February 2013.

is difficult to distinguish between the controversial drone strikes seen in the Middle East during the last few years and the potential use of militarized MAVs.[68]

Necessary Capabilities

The capabilities required for these small air systems are as varied as the six functions of Marine Corps Aviation. The full realization of this concept requires continued technological development and creative application of current technologies. Small air vehicles promise flexibility in their use; developers (civilian and military alike) must also be flexible in imagining a future of unmanned air vehicle use. Likewise, future leaders should see use of small, unmanned air vehicles as augmenting traditional manned aircraft. These systems should operate in concert, not independently of each other. The paradigm by which manned and unmanned vehicles do not mix should change; to that end, the future of Marine Corps Aviation is best maximized by teamwork between both systems.

CONCLUSION

This concept is a creative solution to an exceedingly difficult problem. One can only accept an attempt to distill warfare in a dense urban environment such as a megacity to a short document for what it is: a possible option to solve one perspective of war fighting within a megacity. Using small air vehicles to augment, support, and extend current aviation capabilities will take time, experimentation, and patience. The majority of technologies mentioned in this concept already exist, and their potential uses are limited only by our own ambitions. The British Army bought 160 Black Hornet MAVs for $20 million.[69] Likewise, for a relatively small sum, the Marine Corps might invest in similar technology that could greatly expand Marine Corps Aviation capabilities.

This concept is not merely a collection of current and future ca-

[68] Larry Lewis and Diane Vavrichek, *Rethinking the Drone War: National Security, Legitimacy, and Civilian Casualties in U.S. Counterinsurgency Operations* (Quantico, VA: Marine Corps University Press, 2016).
[69] "Spy Master 2013," Aviation Week & Space Technology, October 2013, 7, 175.

pabilities but shows a possible future in which the Marine Corps can be better prepared for warfare in a dense urban environment like a megacity. Current Marine Corps capabilities prove the force as capable of dominating the ground and rooftops. The concept offers a means by which the Marine Corps can also dominate the space in between—in a megacity—this space is within the individual buildings. The capabilities offered herein create an opportunity for the ground combat element to better perform its mission.

CHAPTER TWELVE

Virtual Resistance Networks

Enabling and Protecting Electronic Information Flows in the Megacity

By Colin R. Relihan

Under current Chinese law, Hong Kong residents can only vote for preapproved political candidates, making it impossible for opponents of Beijing to get on the ballot. By September 2014, the situation had frustrated attempts by grassroots groups, such as Occupy Central, to achieve greater democracy in Hong Kong, leading to a weeklong boycott of classes led by Scholarism, a student group. Approximately 13,000 students campaigned against China's encroachment on Hong Kong's governance. The protests expanded when the Occupy Central movement and Scholarism-led campaign combined. Riot police advanced on the protesters in Hong Kong's Admiralty district in the territory's worst incident of civil unrest in decades, leaving 38 people injured and hospitalized and 78 arrested.

The development of megacities and the rapidly evolving information and communications technology environment likely will overwhelm traditional approaches to intelligence and information operations (IO). Megacities are the focal point for a vast array of electronic and physical networks with highly globalized social and economic connections. Rapid demographic change can stymie any military force's attempt

to gain an understanding of the battlespace. Information and communications innovations such as big data analytical techniques and social media offer new opportunities to understand human terrain. These same technologies create new ways for IO planners to push narratives to target audiences on a massive scale. More people are now able to register their reactions to political change in an accessible, open-source environment such as the internet than ever before. Crowd-sourced intelligence has proven useful for military operations without a human adversary, such as foreign humanitarian assistance and disaster response (HADR). The explosion of social media and other communications platforms can simplify the task of building a "social radar" for monitoring sociopolitical developments in electronically connected megacities.[1] But for military intelligence and IO officers, optimism about the ability of Web 2.0 user-generated content to deliver endless streams of useful social media information may be premature. In the rapidly expanding megacities of the developing world, nonstate armed groups—drug cartels, terrorist groups, and ethnic militias—are likely to attack and subvert electronic social networks that challenge their influence over the operational environment. To prevent the shutdown of these virtual resistance networks (VRNs) by violence and subversion, U.S. military and interagency actors will need to encourage higher volume online information flows from local civilians.[2] And if the American military seeks to use this open-source data to weaken militant groups, it must devise engagement, counterintelligence, and force protection strategies that safeguard local civilians providing this intelligence.

This chapter recommends that the U.S. military develop ways to work with VRNs. While civil society has taken the lead in providing technical support to online actors suffering from government censorship or repression, only the military or other security forces can

[1] Michael T. Flynn et al., " 'Left of Bang': The Value of Sociocultural Analysis in Today's Environment," *Prism* 3, no. 4 (September 2012): 17.

[2] See Howard Caygill, *On Resistance: A Philosophy of Defiance* (New York: Bloomsbury Academic, 2015); Bruce Sterling, "War Is Virtual Hell," *Wired*, 1 January 1993; and Siobhan McEvoy-Levy, *Peace and Resistance in Youth Cultures: Reading the Politics of Peacebuilding from Harry Potter to the Hunger Games* (London: Palgrave Macmillan, 2018).

provide the physical protection necessary to protect VRN participants from real-world reprisal. Criminals and militants have long been able to deter civilians from sharing information with governments and civil society through traditional media, and these groups will likely improve their capability to track unwanted information flows in cyberspace as well. Because of the decentralized nature of online social networks, the military-VRN link will necessarily be an indirect quid pro quo partnership. The network provides open-source intelligence and the military provides protection. Such a relationship will blur the line between intelligence collection, information operations, and civilian security. A joint interagency task force can take advantage of the megacity's connectivity, global links, and density to support layered defenses for VRNs in the face of armed group coercion. If secured, the VRN can provide the basis for an electronic counterinsurgency, particularly in environments where local host-nation governance is too weak or corrupt to be the focus for resistance. A VRN with thousands of participants willing to provide information online can produce massive amounts of sociocultural data, security atmospherics, and other intelligence for the military commander. These participants can come from the local urban area or involve global allies, such as diaspora members, activists, and connected commercial actors.

The development of an open VRN also can serve as an IO objective in and of itself, as militants will be less able to deter local civilian involvement in online information sharing if they see that resistance is possible. Effective collective action by the megacity public is only possible if there is sufficient security. But the solution to physical threats to virtual networks may not be found by exerting more direct control—increased classification of intelligence sources and centralization of IO messaging—but by accepting the information decentralization of the evolving urban environment. Indirect influence over massive, private social networks creates security and IO risks, but open-source electronic media provides speed and volume advantages to the military planner not available through military and government resources alone.

NEW INFORMATION NETWORKS IN THE MEGACITY: OPPORTUNITIES AND CHALLENGES

Traditional U.S. military doctrine recommends isolating urban areas to retain initiative and ability to maneuver, as the high density of people and infrastructure can complicate operations.[3] Even if physical isolation were achievable, growing electronic connectivity and globalized socioeconomic networks makes cutting off the megacity's information links to the outside world next to impossible and generally undesirable. Vital sections of the population rely on internet connectivity more and more, particularly youth who form the bulk of mass protest movements and criminal/militant groups alike.[4] A Pew Research Center 2014 study shows that the 18- to 29-year-old generation across the developing world is rapidly adopting internet, social networking, and smartphone technology far ahead of their older counterparts.[5]

This rapid change can be destabilizing. David Kilcullen claims that the largely uncontrolled expansion of megacities clustered along the world's coasts, and deeply connected with the rest of the globe, will drive future conflict.[6] Modern information technologies, connected youth social movements, and global online activism have already helped feed disruptive change throughout the Middle East during the 2009 Iranian "Green" movement protests and the 2011 Arab Spring, as well as the 2014 pro-democracy demonstrations in Hong Kong.[7] Turning off virtual access, whether done by local militant groups, censoring governments, or a U.S. military seeking to exercise control, may precipitate a broader regional crisis. Megacities serve as the nodes

[3] *Joint Urban Operations*, JP 3-06 (Washington, DC: Chairman of the Joint Chiefs of Staff, 2013), I-2-3.

[4] Yvonne Jewkes and Majid Yar, ed., *Handbook of Internet Crime* (London and New York: Routledge, 2010), 230–55.

[5] *Emerging Nations Embrace Internet, Mobile Technology: Cell Phones Nearly Ubiquitous in Many Countries* (Washington, DC: Pew Research Center, 2014), 12–13.

[6] David Kilcullen, *Out of the Mountains: The Coming Age of the Urban Guerrilla* (New York: Oxford University Press, 2013), 25, 66.

[7] Hooman Majd, "Think Again: Iran Green Movement," *Foreign Policy*, 6 January 2010; Jessi Hempel, "Social Media Made the Arab Spring, But Couldn't Save It," *Wired*, 26 January 2016; and Emily Rauhala, "Hong Kong's Student Leaders Jailed for 2014 pro-Democracy Protest," *Washington Post*, 17 August 2017.

for crucial regional and even global social, economic, and electronic networks. It is more likely that the U.S. military will find itself trying to preserve these linkages to safeguard regional stability than seeking to shut them down.

But if megacity growth, economic globalization, and communications innovations have made old military solutions to the urban battlespace obsolete, they also offer opportunities. Growing penetration of cellular phones, internet, and social media use in developing world cities provides new opportunities to gather information on dense, rapidly changing urban environments.[8] Populations that previously existed in the city's shadows, living in slums, and participating primarily in gray or black markets can now connect to the rest of the world through new modes of informational, social, and economic exchange. Manuel Castells expresses an optimistic viewpoint, claiming that "the emergence of mass self-communication offers an extraordinary medium for social movements and rebellious individuals to build their autonomy and confront the institutions of society in their own terms and around their own projects."[9] According to Castells, these tools later allowed Middle Eastern nonstate groups to coordinate activity and disseminate large amounts of information through massive many-to-many online networks.[10] This information "counter-power" allowed well-organized but largely unarmed groups to challenge state repression and censorship during the Arab Spring.[11]

So new technologies have created new ways for disadvantaged populations to coordinate and to participate in urban governance, and

[8] The concepts behind terms such as *developed* and *developing worlds* are beyond the scope of this chapter. However, additional information on how their complexities may impact urban warfare can be found at Tariq Khokhar and Umar Serajuddin, "Should We Continue to Use the Term 'Developing World'?," *Data Blog* (blog), World Bank, 16 November 2015.

[9] Manuel Castells, "Communication, Power, and Counter-Power in Network Society," *International Journal of Communication*, no. 1 (2007): 249.

[10] The term *many-to-many networks* refers to information generated and received by multiple sources, such as social media and other internet-based forms of communication. See "1 to Many, Many to Many, and Many to 1—for PR and Inbound," *IMRE* (blog), 11 January 2018.

[11] Manuel Castells, *Networks of Outrage and Hope: Social Movements in the Internet Age* (Cambridge, UK: Polity Press, 2012), 42.

they have done so by increasing the ability of online networks to share information publicly. In Nairobi, Kenya, the Map Kibera project allows local populations to provide "volunteered geographic information" to map previously uncharted sections of the city.[12] In New York, the Occupy Sandy movement used social media–driven crowdsourcing to improve distribution of humanitarian aid in the immediate wake of a natural disaster.[13] Both systems rely on decentralized methods to collect and disseminate information, gaining in speed and volume what they lose in direct control. Civil society has taken advantage of these techniques, but the military also is capable of leveraging crowdsourced information to improve situational awareness. Michael T. Flynn, James Sisco, and David C. Ellis rightly caution that geospatial visualization of social media "big data" is insufficient on its own for good sociocultural analysis of the potential battlespace.[14] But social media's utility as an intelligence source will likely improve, as future urban environments will be more saturated with open-source electronic data than in the past. Past network analytical products may have focused on nondigital links, such as tribal affiliation or black-market economic ties, but urban populations of the future—particularly youth—are more likely to organize and communicate online. This shift makes mass collection and analysis of publicly available online social network information more vital than before. If the battlespace's population lives online, then that is where the U.S. military must go to find intelligence.

OPEN SOURCE UNDER ATTACK

Crowd-sourced intelligence has proven useful for missions without a clear adversary, such as foreign humanitarian assistance/disaster

[12] Jiri Panek, "The Commercialisation of Public Data—How Does Participatory Datamining Look on a Global Scale?," *South African Journal of Geomatics* 2, no. 3 (June 2013): 234; and Douglas E. Batson, "Black Spots Are No Treasure Island: Land Tenure and Property Rights in Megacities," in *Understanding Megacities with the Reconnaissance, Surveillance, and Intelligence Paradigm*, ed. Charles R. Ehlschlaeger (Vicksburg, MS: Topical Strategic Multi-Layer Assessment and U.S. Army Engineer Research Development Center, 2014), 41.

[13] Eric Ambinder et al., *The Resilient Social Network: @OccupySandy #SuperstormSandy* (Falls Church, VA: Homeland Security Studies and Analysis Institute, 2013).

[14] Flynn et al., "'Left of Bang'," 17.

relief, but harnessing social media analysis in a conflict environment raises new problems. Criminals, terrorists, and insurgents have always targeted local nationals who report on their activities to state or foreign authorities. They will likely continue to do so against perceived internet or social media informants, attacking and subverting electronic networks that challenge their influence over the operational environment. States such as Iran, Egypt, China, and others have clamped down on online dissent with varying levels of success, but nonstate armed groups will increasingly target civilian electronic networks as well.

Many militant groups and criminal organizations will likely emerge as a hybrid electronic-physical threat, integrating electronic warfare strategies with their traditional ability to use violence to deter civilians from participating in open-source resistance networks. They will often better understand local environments, complicating security force response by nesting themselves among the most dispossessed groups in the city and developing difficult-to-target transnational links. Some of their strategies are simple information denial, such as with the Islamic State's 2014 shutdown of Mosul's cell towers ahead of an expected Iraqi counteroffensive.[15] Others are more sophisticated, such as Mexican drug cartel Los Zetas' communications arm, La Direccion. It reportedly collects electronic intelligence to prevent law enforcement, rival cartels, and the public from interfering in its drug and other illicit businesses.[16] In some cases, state/nonstate armed group online collusion will emerge, possibly as seen during the 2007 and 2008 Estonia and Georgia cyberattacks. There is widespread suspicion that Russian organized crime used its hacking capabilities to support a state's political aims.[17] Groups that mix criminal entrepreneurs and political motivations are especially likely to have the resources and willingness to pursue this hybrid strategy against VRNs.

[15] "Communications Shut Down: Why Extremists in Mosul Have Blocked All Telecommunications," *Niqash*, 4 December 2014.
[16] George W. Grayson, *Mexico: Narco-Violence and a Failed State?* (New Brunswick, NJ: Transaction Publishers, 2010), 188.
[17] Andrew F. Krepinevich, *Cyber Warfare: A "Nuclear Option"?* (Washington, DC: Center for Strategic and Budgetary Assessments, 2012), 22–23.

In a 2010 speech on internet freedom, then U.S. secretary of state Hillary Clinton claimed that "information has never been so free," recognizing that state censorship posed one major threat to internet freedom.[18] But nonstate armed groups pose a different threat, using coercion to prevent VRNs from developing, imposing what John P. Sullivan called "zones of silence" when he described the cartel-dominated information environment in northern Mexico.[19] If the U.S. military operates in a future megacity conflict and does not protect these VRNs from militant intimidation, it will have little social radar to monitor.

Events in the Middle East—primarily the 2011 Arab Spring but also the 2009 Iranian Green Revolution—are among the most commonly cited examples of the future role played by social media networks in fostering resistance networks.[20] Twitter, Facebook, and cellular phones all allowed antigovernment activists to organize protests and share information with the outside world. During the Arab Spring, government countermeasures to limit protester access to the internet largely failed. Local activists and their international supporters developed innovative workarounds for continued access, such as a program that evaded an Egyptian internet ban by converting voicemail messages into online text "tweets."[21] Cyberspace-only repression strategies failed, but elsewhere hybrid physical-digital strategies met with greater success. Also in 2011, but across the Atlantic, the hacker network Anonymous launched Op Cartel, threatening to reveal information on Los Zetas members and Mexican government associates to the public. Los Zetas did reportedly release an Anonymous-associated Mexican hacker, but countered the larger threat to reveal information by claiming it would kill 10 random citizens for every name

[18] Hillary Clinton, "Internet Freedom" (speech, Washington, DC, 21 January 2010).
[19] John P. Sullivan, "Attacks on Journalists and 'New Media' in Mexico's Drug War: A Power and Counter Power Assessment," *Small Wars Journal*, 9 April 2011.
[20] Castells, *Networks of Outrage and Hope*, 53–66, 94–105; and James Jay Carafano, *Wiki at War: Conflict in a Socially Networked World* (College Station: Texas A&M University Press, 2012), 57–62.
[21] Castells, *Networks of Outrage and Hope*, 61–66.

released.[22] States may feel constrained from using extreme violence against online informants and activists, but many gangs, terrorist organizations, and other nonstate threats that proliferate in developing world megacities will feel no such restraint.

In this contested environment, enabling and protecting online information networks is difficult because their source of strength also makes them fragile. According to James Jay Carafano's study of electronic social networks and conflict, only a few actors in any online information network—broadcasters—are responsible for the vast majority of activity linking different network segments.[23] Nonstate armed groups can quiet whole networks just by intimidating or killing the most active broadcasters. Potential social network participants face a collective action problem as broadcasters create value for all network members who want to resist militant influence. However, in the face of widespread intimidation, few or none are willing to take on these crucial, but vulnerable, nodal positions in an online information network. Violence deters anyone from exercising the crucial "network-making" power that creates links between subnetworks and ensures sufficient information flow among the members.[24] Without these key actors, local civilians are likely to act rationally and rely on "self-help" strategies that increase their personal security without providing broader resistance.[25] But without coordinated action, thousands of individual rational decisions to avoid attracting any reaction from a violent cartel or militant group—gated neighborhoods, shuttered newspapers, and mass migration to safer areas outside the urban area—destroy the city's resilience.

Stephen Graham called this tendency urbicide when describing wartime Baghdad, where walls, security guards, and other security measures broke down the vital economic and social activity that gave

[22] Damien Cave and Ravi Somaiya, "Facts Blur as Online Feud Ends in a Draw," *New York Times*, 4 November 2011; and Scott Stewart, "Anonymous vs. Zetas Amid Mexico's Cartel Violence," *Security Weekly*, Stratfor, 2 November 2011.
[23] Carafano, *Wiki at War*, 8–9.
[24] Manuel Castells, "A Network Theory of Power," *International Journal of Communications*, no. 5 (2011): 776.
[25] John Bailey, *The Politics of Crime in Mexico: Democratic Governance in a Security Trap* (Boulder, CO: Lynne Rienner, 2014), 75.

the city life.[26] Preventing urbicide and zones of silence is particularly relevant for megacities of the future, which will serve as the center of regional and even global economies. Graham admonishes that turning off informational, economic, and other flows in an attempt to manage the security situation is a form of "suicide."[27] Conventional military operations commonly disrupt and destroy, but information-centric megacity warfare seeks to protect civilian open-source networks and create resilience. To prevent urbicide and restart the city's circulation, intervening military forces will need to address two broad categories of action: countering zones of silence and protecting VRNs. These efforts will require intervention strategies based in both cyberspace and the physical world.

COUNTERING ZONES OF SILENCE

A healthy, active online information environment will provide analysts sufficient data to exploit methods, such as sentiment analysis and social network mapping, to build up an intelligence picture of the urban battlespace. But this may not initially be possible for many neighborhoods where zones of silence have developed. Combining geotagged tweets, other social media posts, and telecommunications infrastructure in a common visualization will allow the joint task force commander to identify the areas of the city that produce little security or sociocultural atmospheric information. There may be multiple reasons for a lack of information emerging from a neighborhood. Militant groups may be intimidating the local population, who are deterred from providing online resistance or information. The next section will look at U.S. military options when nonstate armed groups are creating these data black holes by targeting online information networks. These techniques also may prove useful if the reasons for silence are rooted in a neighborhood's lack of economic development or political apathy resulting from being ignored by the host-nation government.

There are several measures U.S. military elements can take to raise the "volume" of online networks. Communications and engineer-

[26] Stephen Graham, *Cities Under Siege: The New Military Urbanism* (London: Verso, 2010), 241.
[27] Graham, *Cities Under Siege*, 264.

ing detachments can increase the local population's ability to access online networks, especially if militant groups respond to civilian reporting by attacking or subverting existing internet or cellular infrastructure. Instead, the task force can crowd seed internet connections by sowing Wi-Fi hubs or cheap internet-accessible mobile phones throughout the megacity. This can help ensure free online connections available to civilians interested in reporting on security issues. Partnerships with local businesses and civil society can build further sources of resilience and a positive local-centric IO message. Engineering elements can partner with local information technology (IT) firms to provide a broadband backbone for the megacity. Increased bandwidth will allow local civilians to not only post text on social media, but better enable use of camera phone and video capabilities to improve the quality and impact of their messages. The Arab Spring and Iranian Green Revolution experiences showed that the more options for online resistance, the better. Multimodal systems reliant on no single transmission conduit and using multiple available technologies offers flexibility to local populations if militants threaten one communication platform or another.[28]

Besides direct involvement in building information infrastructure, engagement with local business and IT communities can help reduce zones of silence. Even in developing countries, megacities may be centers for a nation's telecommunications investment and IT elite. Developing world urban centers as diverse as Bangalore, India; Monterrey, Mexico; and Cairo, Egypt, are regional IT and media centers. The city's IT business sector and universities are likely sources of computer-savvy individuals for the host nation, civil society, or adversary, so the U.S. military should treat them as key human terrain.

Engagement with these groups provides three potential advantages. First, they provide local knowledge of the operational environment, which can be vital in developing strategies to encourage local participation in online networks. Second, they provide credibility. U.S. military efforts to build Wi-Fi networks or develop social media platforms may raise suspicion from many urban populations worldwide,

[28] Castells, *Networks of Outrage and Hope*, 61–66.

but locally developed initiatives will likely be more acceptable. For example, in cartel–plagued Monterrey, Mexico, local businesses helped develop Tehuan, a social network focused on public safety reporting.[29] Because of its potential role as a force multiplier and IO conduit, U.S. military outreach to a megacity's business/IT sector is crucial in creating information advantage in a social media–saturated environment. Finally, the adversary also can attempt to take advantage of this element of the human terrain to boost their information operations. For example, some IT workers in Bangalore, India, have created greater instability by providing logistic support to Islamist terror groups.[30] Engagement that not only fosters communication but economic development keeps these key cyberspace actors employed and less likely to provide services to nonstate armed groups.

Information dispersal is another option to combat zones of silence. The military can leverage transnational partners, such as diaspora organizations or multinational corporations with interests in the target megacity. Civil affairs or Department of State personnel can engage local civil society through these transnational actors. Local actors are more apt to provide intelligence if it is passed through a trusted intermediary via more secure, but still private, means such as virtual private networks (VPNs), financial remittance systems, and corporate reporting mechanisms. Having multiple information conduits inside and outside the megacity for local actors to push security reporting provides the layered, resilient defense necessary to protect online information networks participants from discovery, while still maintaining the volume and IO advantages of an open-source network. Other mission sets will address the civilian network's security concerns more directly.

PROTECTING VIRTUAL RESISTANCE NETWORKS

If the U.S. military and interagency can help local actors connect to online networks to ensure mass security reporting, it is vital that the

[29] "Acerca del CIC" [About the CIC], Centro de Integración Ciudadana.
[30] Shiva Kumar, "Bangalore Hub of Techie-terror Network," *Times of India*, 28 February 2008.

United States develop methods to protect networks threatened by nonstate armed groups. The VRN protection mission is critical for two closely related reasons. First, civilian open-source networks are fragile, large, and potentially influential, but they often rely on a limited number of vulnerable nodes. Broadcasters and network managers allow social media systems to produce massive quantities of data by linking large numbers to the network. The same quality makes these networks fragile if key nodes are targeted. However, this vulnerability can simplify the military's job. If the military can identify and protect those key nodes—a popular blogger, a public-minded software developer, or a locally trusted nongovernmental organization (NGO)—it can safeguard the whole information-producing system.

In a related concept, physical protection—not just cybersecurity and network expansion measures—is crucial because it is a mission that civil society actors often cannot replicate. During the Arab Spring and the 2009 Iranian Green Revolution, outside IT-savvy actors used many of the techniques described in the previous section to counter zones of silence without outside government assistance. In the face of government attempts to restrict protesters' network access, outsiders—diaspora populations and online activists—enabled local groups to maintain access to social media and other communications tools. But hackers and diasporas could not provide the physical protection local protesters needed. In the case of Cairo and Tahrir Square, local soccer fan networks provided necessary muscle to keep government security forces away, while in Mexico, bloggers died as host-nation security forces were often outgunned and subverted by cartel enforcers.[31] Both the U.S. government and private actors have multiple options to expand opportunities for high-volume social media reporting and big data open-source analysis. The U.S. military will often have advantages over private actors in terms of resources and access to transnational partners, but protecting VRN participants from physical reprisal is a task that only government security forces can truly do. And

[31] Castells, *Networks of Outrage and Hope*, 55; Shaun Waterman, "Mexican Anti-Cartel Blogger Is Murdered, Decapitated," *Washington Times*, 10 November 2011; and "Administrador de 'Valor de Tamaulipas' Anuncia Cierre Definitivo de la Página" [Administrator for "Value of Tamaulipas" Announces Final Closure of the Page], *El Proceso*, 7 April 2013.

if host-nation security forces are overwhelmed, corrupt, or not locally trusted, the U.S. military and its interagency partners may own that network protection mission, both in the physical and cyberspace realms.

The VRN protection mission consists of two parts: identify and protect. The joint task force needs to identify what nodes are most critical to the network's survival and success and which ones are most threatened by violent actors. Open-source analysts could identify key actors within the megacity already at the center of information-centric resistance. Traditional counterintelligence capabilities could also help identify the reprisal and extortion networks of nonstate armed groups. Analysis should move beyond reactive measures to assess preemptively which network nodes are most likely to be targeted in the future. Open-source intelligence officers can perform social network analysis to assess which online actors are central to information flows. Integrating open-source social media and counterintelligence analysis should help assess current threats. The intelligence cell's ultimate goal should be to develop protection measures for civilian network participants even before the militants' reprisal architecture has identified the target. The ability for preemptive protection measures is necessary because, once a nonstate armed group has decided to intimidate an online informant, it is often too late to reassure network members that their activity is safe.

How we reassure key civilian network participants that they can continue their organizing activity is crucial. Online activists, journalists, NGOs, and other groups may not trust the U.S. military. Building trusted relationships is more important than traditional command and control mechanisms. The joint force commander cannot give orders to a civilian information network. Attempts to overtly influence the online network would likely backfire by undermining the IO message that the local population is creating its own forms of resistance. Interagency partners may have more credibility in this area, with military intelligence, communications, maneuver, and civil affairs elements prepared to support the Department of State, the U.S. Agency for International Development (USAID), and other civilian agencies. Network influence and protection boards (NIPBs), consisting of military, intelligence, and

other interagency elements active in the megacity would allow for a coordinated U.S. government civilian protection effort. Intelligence and military members would be responsible for identifying which online activists and groups need protection. NIPB members would deconflict which agency will be responsible for each target and decide who receives what kind of protection. Intelligence analysts also can identify potential sources of support outside the megacity, such as diaspora organizations, multinational corporations, or NGO networks. NIPB members can then arrange for other U.S. government elements to engage those out-of-theater organizations.

The military component is well-suited to address physical protection concerns. Civil affairs and security assistance teams can engage with civil society and business organizations to improve physical security measures. Training can be offered through secure online means so as to avoid associating the network node too closely with the U.S. government. Military patrols in commercial areas can increase civilian confidence and reduce opportunities for militant extortion teams to operate. Finally, countersurveillance and close protection teams can respond to immediate threats or cover particularly critical information nodes. Special operations forces can focus direct action operations against a nonstate armed group's reprisal and cyberspace teams. As nonstate armed groups increase their options for identifying online informants, U.S. military and interagency elements will need to prepare for multiple avenues of subversion from the militants' reprisal architecture. Los Zetas operations in northern Mexico during the past several years suggest that future nonstate armed groups may exploit three broad capabilities to identify online VRN participants.[32] They can use traditional informant networks to identify online activists with insufficient offline operations security measures. Nonstate armed groups (NSAG) can develop organic computer network exploitation capabilities to identify VRN participants, possibly by recruiting local IT professionals. Finally, they can bribe law enforcement and security

[32] Krepinevich, *Cyber Warfare*, 22–23; Grayson, *Mexico*, 188; and Stewart, "Anonymous vs. Zetas Amid Mexico's Cartel Violence."

personnel into providing them access into a country's telecommunication infrastructure.

Improving nonstate cyberspace capabilities highlights the need of the joint task force or interagency to support virtual protection measures through programs to improve network participants' cybersecurity. It may be impossible to prevent a determined militant reprisal team from identifying some online activists, but cybersecurity experts inside and outside the U.S. government can provide training and tools to increase the likelihood of remaining anonymous. Cyber protection teams provided by U.S. Cyber Command, USAID contractors, or partnered NGOs may be most effective in improving civilian online security practices, with local threat and trust levels driving the NIPB's decision. Outside diaspora and civil society are another avenue of cybersecurity support, as local actors are more likely to provide intelligence if it is passed through a trusted intermediary. Having multiple security programs inside and outside the megacity helps provide the layered, resilient defense necessary to protect the VRN while still maintaining its open-source advantages. Encouraging and protecting sources of crowd-sourced intelligence online can address all elements of this layered defense—focused on anonymity, dispersal, and mass. This may increase overall civilian security if it even partially replaces nondigital institutions, such as analog media like newspapers and radio stations with targetable physical addresses.

The military's final contribution to protect online information networks is to prevent catastrophic subversion of the network. Besides the node-specific NIPB effort, the intelligence cell also needs to monitor the "commanding heights" of the electronic domain in the urban battlespace, including the city's telecommunications infrastructure, host-nation law enforcement, and the IT sector (both businesses and universities). Extorted telecom executives, unemployed computer science graduates, and corrupt police wiretap officers may provide militants with access to subvert online information networks on a massive scale. Joint task force counterintelligence activity, commercial and academic liaisons, and patrols of key IT-related terrain all reduce the chances of a catastrophic subversion of the whole information network. Focusing interagency anticorruption efforts on government ac-

tors with greatest access to telecommunications networks may also mitigate risk. In the end, protecting online information networks is similar to other aspects of military operations in the megacity. It favors resilient systems and open information flows over disruption, destruction, and urbicide.

THE ELECTRONIC COUNTERINSURGENCY: TRANSFERRING VRN PROTECTION TO THE HOST NATION

Effective collective action by the megacity public is only possible if they can organize and share information, but only with sufficient security. The U.S. military helps create security and local resilience by expanding information access, creating electronic safe havens, and creating positive feedback loops between the U.S. government and the local population. U.S. forces may develop an indirect information-for-security quid pro quo relationship with these networks, but this is an indirect connection. Indirect influence over massive, private social networks creates security and IO risks. The military cannot control the VRN's message, and the intelligence cell will need to verify the most critical elements of VRN-provided intelligence to provide a safeguard of militant subversion of the network. But open-source electronic media provides speed and volume advantages to the military planner not available through military and government resources alone. The fact that the military commander cannot control these online information networks reinforces their power as information source and change agent.

If protected and access is assured, online information networks are likely to grow. A large enough network could provide sufficient quantities of intelligence that would allow government forces to counteract nonstate armed threats. The large network itself could also serve an IO purpose by its continued public existence in the face of militant disapproval, rallying others to see resistance as possible. This is another advantage of an open-source network over a clandestine one. If adversaries attempt to break it but fail, the network becomes stronger.

As time passed, continued reporting from the online information

network could allow the U.S. government to shift responsibility back to host-nation security forces. As seen in locations as diverse as Mexico, Egypt, and Hong Kong, online civilian networks will commonly push anticorruption messages and other campaigns designed to compel improvements in host-nation government and security force performance. As the online information network matures, the immediate militant threat recedes, and the activists' ability to monitor corruption improves. This may enable the military to work with DOD or Justice Department-vetted host-nation security or law enforcement units. The joint task force could transfer its network protection duties, including the NIPB, to these trusted host-nation elements, creating intermediate structures that would survive the U.S. military's departure. This could support the long-term U.S. end state of enabling host-nation security structures to manage the militant threat after the U.S. military's withdrawal. In Castells's words, the information networks shift from a "network of outrage" focused on militant coercion to a "network of hope," a change agent that provides grassroots pressure for longer-term improvements in civilian security.[33]

CONCLUSION

Current military doctrine focuses on avoiding a fight in urban areas, isolating them whenever possible. But megacities are too vital to cede to insurgents, drug cartels, and terrorists, as they serve as economic, social, and political hubs on a regional and global scale. While megacities create many problems, growing so quickly multiplies security and governance issues for U.S. partner countries, and these countries require the economic vitality these urban areas produce. As a result, warfighting doctrines that disrupt or isolate those crucial flows threaten a country's overall health. Physical barriers, such as those built in Baghdad or Belfast, are isolating, as are barriers in the informational environment. NSAG can threaten the megacity's electronic flows, threatening the local population, corrupting host-nation institutions, and preventing local reporting of security threats. Information flows

[33] Castells, *Networks of Outrage and Hope*.

such as these are the urban area's central nervous system, sending messages that drive change within private and public-sector institutions to counter threats to the megacity's well-being.

Enabling online information flows and the VRN protection mission allows U.S. military forces to help restart those flows where violent and subversive actors have been able to impose zones of silence, leaving the host-nation government incapable or too compromised to respond. Civil society may exist but remains incapable of coordinated resistance in the face of NSAG threats. But a U.S. military/interagency task force can take advantage of emerging trends in the megacity to boost the local population's own ability to report and resist. Increasing electronic connectivity globally provides new options to develop forms of online "counterpower" to militant and criminal influence, in the form of the VRN. Globalization creates new communities of interest outside the megacity that can support the VRN's development. The megacity's own vitality, in the form of dense commercial and social networks, can become a mechanism to jump-start reporting. The VRN can support a public intelligence cycle whereby increased reporting by network participants on security threats improves the military's ability to protect the VRN. Traditional military capabilities, such as counterintelligence and special operations direct action, buttress the VRN in areas where the public does not have the will or capacity to act.

But the end-state goal of enabling and protecting VRNs is to make U.S. military intervention unnecessary. The U.S. military and interagency enable the VRN to grow in its early stages, helping it over the threshold of the collective action problem. Over time, it should acquire its own momentum, building its own links to the global community and developing its own tools for online security. In the long run, the VRN supports real-world civil society mechanisms, such as NGOs and media organizations, previously weakened by militant coercion. Ultimately, the VRN may challenge the host nation's own poor security and governance performance, whether a result of corruption or limited capacity. VRNs based in the megacity, a likely stronghold of political and economic strength, are well-placed to pressure the host-nation government to improve its performance and provide secu-

rity. VRNs thus protected and shepherded are able to reestablish the feedback loop between the government and the governed. This will enable U.S. military forces to hand responsibility back to host-nation forces, with politically active VRN members providing the incentive to counter future threats in the target megacity.

CHAPTER THIRTEEN

The City Prism

A Triangle of Urban Military Operations

Henrik Breitenbauch, Mark Winther, and Mikkel Broen Jakobsen[1]

Haiti saw a resurgence of political and economic actions along with a newly elected leader in 2006, which would prompt the United Nations to extend the mandate of the UN Stabilization Mission in Haiti (MINUSTAH). In Port-au-Prince, Haiti, however, the heavily armed gangs controlled the streets and the city's slums. Gang leaders garnered support from the local population through fear and intimidation, but also by providing services they could not get from the government. The MINUSTAH actions to counter the gangs was implemented in a gradually escalating series of military operations attacking the gangs from multiple perspectives.

INTRODUCTION

Cities are centers of power and resources, and power and resources drive political conflicts. Where there are people, there are conflicts. Increasing urbanization also means a rising number of political conflicts in urban areas. Some of these conflicts will be violent, ranging from

[1] All authors are affiliated with the Centre for Military Studies, University of Copenhagen.

organized crime and forceful political factions to armed resistance and civil war, often with international dimensions. Some of these violent conflicts and its actors will merely be criminal, a bane to the local population, while others will be a threat to national or international stability, including transnational terrorism. Because of population growth, urbanization, and poor government, the problem will therefore remain—and likely become further—politically, strategically, and militarily relevant in the decades to come.[2]

As has already been visible in the campaign to defeat ISIS, Western political leaders will increasingly be faced with choices of whether to authorize the implementation of various kinds of military operations in urban terrain (MOUT) to influence or force an end to such conflicts. Western military and civilian organizations must therefore analyze and make plans to deal with such operations. The combination of the increased share of cities in future operational environments and changes in the Western approach to military operations—including broader political intentions regarding stability and the imperative to protect civilians—poses conceptual and practical challenges for the state and its military and civilian organizations.

When faced with a city as a military problem, the preferred options have traditionally been: avoid them (or lay a siege), or raze them to the ground. Because of the urban topography, the city represents a fundamental challenge for armed forces, as it complicates military activities, such as reconnaissance, the exchange of fire, communications, and even simple transport. This all combines to reduce considerably the ability to acquire an understanding of a situation. Streets

[2] Urban military operations force us to think more holistically about what it is that the military instrument is meant to achieve, but this thinking does not appear automatically. The authors would like to thank Benjamin Jensen for inspirational conversations on, among many other things, the 2015 megacities study with his colleagues at the U.S. Army Chief of Staff's Strategic Studies Group. See Col Marc Harris, USA, et al., *Megacities and the United States Army: Preparing for a Complex and Uncertain Future* (Arlington, VA: Office of the Chief of Staff of the Army, Strategic Studies Group, 2014). Parts of this chapter stem from a report on MOUT published by the Centre for Military Studies at the University of Copenhagen in Danish. See Henrik Ø. Breitenbauch et al., *Byens prisme: Tendenser og udfordringer for militære operationer i urbant terræn* (Copenhagen: Centre for Military Studies, University of Copenhagen, 2016).

and alleyways are transformed into gorges and gullies that limit communications and provide defending forces with perfect conditions for carrying out ambushes. Intervening military forces have therefore traditionally sought either to avoid this theater of operations entirely or, if they possessed adequate firepower, to neutralize the significance of the theater by totally destroying the city without considering the civilian population.

But two factors combine to challenge the Western military organization to think differently and conceive of how to engage operationally with the city. Political demand for broad counterterrorist efforts also include urban operations through warfighting, peace operations, and special forces operations, including combinations of these to provide stabilization. At the same time, Western expectations shaping the use of armed force dictate an increasing political requirement for following international humanitarian law (IHL) and other kinds of normative regulations that work against extensive use of firepower.[3]

Because urban operations are notoriously difficult, they are at the same time prisms of a larger set of conceptual problems for Western military operations. Since the end of the nineteenth century, Western militaries have, to a large extent, turned into pure warfighting organizations or institutions that exist functionally, as well as at the level of professional self-understanding, to use lethal force to fight and win wars. This division of labor between warfighting and other security tasks has not been fully implemented for the reason that the state that controls the military institution occasionally (and sometimes often) also requires the military to continue carrying out security tasks other than annihilating the enemy, as was the case in earlier days. The task of policing in various meanings of the word (not all of them civilian) thus continues to haunt Western militaries as a kind of professional phantom pain. Western militaries live with a tension between their intentional design (as lethal organizations) and their

[3] IHL refers to "a set of rules that seek to limit the effects of armed conflict. It protects people who are not or are no longer participating in hostilities and restricts the means and methods of warfare." See "War & Law," International Committee of the Red Cross.

political taskers (to not only deter and, if need be, win wars but also to bring conflicts to a peaceful end). Add to this situation the complexities of a quickly growing population in the Global South (a.k.a. the Third World), much of it in megacities outside of formal government control and governance.

Western military leaders are therefore faced with a triple challenge: to increase organizational self-awareness of the warfighting paradigm and its limits (not to destroy it, but to help supplement it and shift gears when necessary); to engage continuously with the political requirements of policing (or peace operations); and to face the new reality of a fast-growing world with battlefields of a size where Western militaries may be able to dominate locally but not seize or hold terrain at a broader scale, including the human terrain. Urban operations challenge us to rethink our approach to conventional operations, particularly regarding the ability to operate in the absence of territorial control and to solve or support civilian police work—both of which fall outside of a twentieth century self-understanding of the military organization.

This chapter introduces a model depicting a triangular space of military operations that enables us to derive and discuss some important overall dynamics of MOUT—dynamics that are typical of this broader set of dilemmas and tensions facing Western military operations, in particular in the Global South.

While the model is a transparent and systematic conceptual construct, it is also merely a heuristic device enabling the structured use of ideal types to derive a broader analysis. It is not predictive, and it is not meant to be an exhaustive illustration of all military operational activities. But what it lacks in detail it makes up for in reach: the model fundamentally challenges the implicit argument of the spectrum of conflict that has undergirded much of U.S. and NATO doctrine development since the 1990s. This full spectrum approach tacitly proposes that the ability to conduct operations at the lower and middle level of the conflict spectrum is included in the ability to conduct high-intensity operations. The operations triangle shows how there is an inherent tension between the two problems sets and corresponding

capabilities—and that these cannot be seen, according to Thomas P. M. Barnett, as "lesser includeds" in overall defense planning.[4]

Two main sections follow. In the first, the operations triangle is introduced, and in the second section, it is applied to the urban environment to identify implications relating to each operations' ideal type as well as the dynamic mix required for stabilization operations. Finally, we sum up and discuss takeaways.

THE OPERATIONS TRIANGLE

Military operations vary with respect to their ends and means. The nature of the city renders the ends more complicated to realize and the operative means more difficult to use. Based on experiences from operations in Mogadishu, Somalia; Port-au-Prince, Haiti; Sarajevo, Bosnia and Herzegovina; and other conflicts in the 1990s, General Charles C. Krulak, in his concept of "Three Block Warfare," points out that in order to be effective, military forces must sometimes simultaneously carry out classic combat operations, peacekeeping operations, and humanitarian aid all within a three-block area.[5] Krulak's remarkable analysis briefly summarizes a fundamental—possibly the most fundamental—strategic challenge to military operations; operations do not become successful via combat alone, but they often consist of complex and not necessarily mutually helpful tasks and capabilities.

This section introduces a new way to think holistically about military operational activities. First, we introduce three fundamental distinctions between the different attributes a military operation may have. Second, these systematic distinctions are then used to define three ideal-type military operations, logically combined in a triangle.

The idea of the model is that while each corner of the triangle represents the pure ideal type, every coordinate inside the triangle represents a specific operation, characterized by a mix of the three types, in a given moment. A conflict or an operation may, over time,

[4] Thomas P. M. Barnett, *The Pentagon's New Map: War and Peace in the Twenty-first Century* (New York: Putnam, 2004).
[5] Gen Charles C. Krulak, "The Strategic Corporal: Leadership in the Three Block War," *Marines Magazine*, January 1999.

move through the triangle as the dynamic of the conflict shifts, though ideally due to the effort of the military operation that is then continuously recalibrated.

We distinguish between three fundamental ideal types of military operations: combat operations, peace operations, and special operations. The three operation types are essentially different, regardless of the environment in which they are carried out. But the differences are accentuated in urban environments due to the dense topography. We define them by asking whether they: 1) seek or require territorial control, 2) seek or require police work, or 3) take place in a very hostile environment. The following section unfolds these distinctions to show how they are central to the military instrument.

Territorial Control

The basic purpose of using military force has always been to defend one's own territory or to take control over others' territory. The formation of the modern European state made war a matter between states, as states proved superior to all other forms of political organization with respect to providing the capital and other resources (e.g., soldiers) necessary to the waging of war.[6]

Cities, capitals in particular, are the center of power with respect to providing these resources. At the same time, they are the center of state institutions and political power. Conquering a capital city is therefore to be regarded as entirely decisive for the realization of any strategy for obtaining control over the territory of another state.[7] Civil wars that take place within states are usually the result of conflict between various political, social, or ethnic groups regarding the control of the territory and state apparatus, meaning that they also typically play out inside important cities.

Territorial control also can be something other than an end or a military objective unto itself. For example, obtaining territorial control also can serve as a means to realize a broader political aim than the

[6] Charles Tilly, *Coercion, Capital, and European States, AD 990–1990* (London: Blackwell, 1990).

[7] Louis A. DiMarco, *Concrete Hell: Urban Warfare from Stalingrad to Iraq* (Oxford, UK: Osprey Publishing, 2012), 15–26.

military operation itself. Stabilizing a conflict situation—and peacemaking and peacekeeping efforts in general—depends on whether there is territorial control. In that sense, territorial control constitutes a necessary means and the very foundation in this second type of military operation.

However, the exercise of modern military force does not always require—or is it always aimed at achieving—territorial control. When special military units are deployed behind enemy lines to gather intelligence, evacuate noncombatants, facilitate the introduction of land forces, or eliminate strategically important, hostile political and military leaders, territorial control is not part of the equation. Here, typical for special forces, it is instead about remaining hidden when carrying out operations in enemy territory. Territorial control is therefore a significant but not ubiquitous objective for military operations.

Traditional Military Operations versus Policing

The formation of the modern European state allowed for a monopoly of the use of military force by a government within a given territory.[8] Along with the industrialization and democratization of the Western European states, there was an increasing need to maintain law and order, and at the same time, calls for limits on the authority of military organizations over their own citizens.[9] In the European state model, this resulted in the crystallization of a state police organization that was subject to and entrusted with enforcing the law in relation to its own citizens, while the military organization became (almost exclusively) responsible for exercising and maintaining state sovereignty in relation to foreign powers. From this point in time—often relatively late in the nineteenth century—it makes sense to draw a distinction be-

[8] Tilly, *Coercion, Capital, and European States*; Michael Mann, *The Sources of Social Power*, vol. 1, *A History of Power from the Beginning to AD 1760*, new edition (New York: Cambridge University Press, 2012); Otto Hintze, "Military Organization and the Organization of the State," in *The Historical Essays of Otto Hintze*, ed. Gilbert Felix (New York: Oxford University Press, 1975), 178–215; and Max Weber, "Politics as a Vocation," in *From Max Weber: Essays in Sociology*, ed. H. H. Gerth and C. Wright Mills (New York: Oxford University Press, 1946), 77–128.

[9] Michael Mann, "The Autonomous Power of the State: Its Origins, Mechanisms and Results," *European Journal of Sociology* 25, no. 2 (1984): 185–213; and Mann, *The Sources of Social Power*.

tween work that is carried out by police, including fighting crime and maintaining law and order in connection with demonstrations, as opposed to work that is carried out by the military, such as the exercise of sovereignty in various forms and maintaining the collective defense of the state.

Since the beginning of the twentieth century, the modern Western military organization has largely established its self-understanding in terms of foreign and combat-oriented tasks. This relatively recent ideal (historically speaking) has been more an aspiration than a clear reality. The lengthy experience of the U.S. Marine Corps with stabilization missions in the broad sense in the Philippines and elsewhere offers examples of how this functional distinction is not always historically unambiguous.[10] Nevertheless, according to Samuel P. Huntington, the military profession has developed into a profession for "the management of violence."[11] In the West—and particularly from the East–West perspective during the Cold War—this concept was interpreted relatively narrowly as a matter of carrying out high-intensity combat operations.

In connection with the North–South perspective in world politics, however, it is difficult to reduce the meaning of management of violence to a matter of the ability to conduct major combat operations. The continued existence, particularly in southern Europe, of constabulary forces (i.e., security forces with a specialty overlapping the two extremes, such as carabinieri, policia militar, or gendarme) offers an example of the lengthy institutionalization of a functional, society-wide need. The distinction between classic military operations that are focused on combat (against a symmetrical opponent) and other types of security-related work involving military and other similar organizations is an important theme, especially when Western military forces must relate to security challenges outside of the West itself, including urban environments.

[10] Max Boot, *The Savage Wars of Peace: Small Wars and the Rise of American Power* (New York: Basic Books, 2002).

[11] Samuel P. Huntington, *The Soldier and the State: The Theory and Politics of Civil-Military Relations* (Cambridge, UK: Belknap Press, an imprint of Harvard University Press, 1957), 12.

When conceiving of the city as a security issue that can ultimately require the involvement of (foreign) military forces, it is also necessary to think things through in reverse from military operation to the city's problem. This means we must conceive of military operations in urban environments more broadly than mere combat operations with respect to territorial control. It is necessary to undertake security work before, during, and after the actual combat, which by nature is more policing than a classic military assignment. Similarly, many of the security issues emerging from the city itself, and those that risk creating instability, call for more of a police response than military action—or something in-between. One example could be the creation and maintenance of security or order in slums, or other such areas outside or on the edge of the territorial control of the state.

Recognizing the need to address this exact type of security issue in the gray area between traditional military and traditional police work, NATO developed doctrine regarding stability policing.[12] The need for such police work will always be greatest in cities, as the population and struggle for resources is most intense there, which can create conflicts and disrupt the established order. While police-related issues are not part of the conventional military understanding, for operations in urban environments to be effective, they presuppose an analytical understanding of these broader security dynamics, particularly when the general objective is a gradual transition from combat to peace operations.

Hostile Environment

The third and final parameter for the operation types presented below is based on whether or not the military operation takes place in

[12] NATO's definition of the tasks that fall within stability policing include, but are not limited to, community based policing (patrolling), restoration of public security and public order, crowd and riot control, traffic circulation, searches and seizures, criminal investigations, high-risk arrests, protection of people (vulnerable groups) and property, support to judicial and correction institutions, conduct of forensic activities, support to weapon intelligence teams (WIT), counterterrorism, counterorganized crime, crime scene management, counterdrug and counterhuman trafficking, war crimes investigations, and assistance to international courts. For the full list, see *Allied Joint Doctrine for Stability Policing*, AJP-3.22, ed. A, ver. 1 (Brussels, Belgium: NATO, 2016), A1.

a clearly hostile environment, where deployed forces have a high risk of engaging in combat. In this case, the forces may become involved in major battles, as in Stalingrad, Soviet Union; Aachen, Germany; and Berlin, Germany, during World War II; the battle of Hue, Vietnam, during the Vietnam War; the Russian invasion of Grozny in Chechnya; or battles in Baghdad, Iraq, during the Iraq War. Here, the objective of the military operation is simply to win the war.

Conversely, where there is not talk of a genuine state of war, the deployed forces may play a substantially different role and go about very different work, such as the UN presence in Somalia and Mali, where the operations are conducted in the tension between maintaining a fragile peace and restoring this peace in the cases where it has been violated. Similarly, operations in large slum areas aimed at restoring law and order, such as the Brazilian Army's efforts in Rio de Janeiro, Brazil, can be viewed as an example of how the deployed forces are not in an actual state of war even if they may be subject to intermittent higher levels of threat. The distinction between a security environment defined by an actual state of war and one that may be merely dangerous is of central importance.

Three Ideal-type Operations

Given the explanations presented above, figure 13.1 applies the three distinctions as intersecting lines. The ensuing logical operational space is marked with a triangle. Each corner in the triangle then illustrates an ideal typical military operation type.

The first type—combat operation in the lower left hand corner—is characterized by an actual state of war. In its purest form, the combat operation is characterized by an attempt to seek territorial control and a lack of police work. This is the operation type that can best be compared with the traditional understanding of "actual war" and is aimed at isolating, neutralizing, or ultimately destroying all or part of an opponent's military apparatus to wrest control of the enemy's military capabilities and territories.

The second type of operation—peace operation in the top corner—is fundamentally about police work. In its purest form, the peace operation is marked by an attempt to seek or demand territorial control

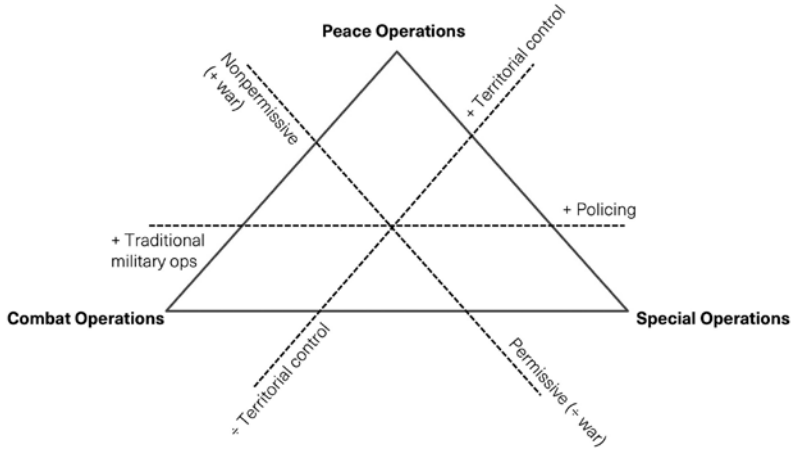


Figure 13.1 The ideal operation.
Illustration by MCUP

in a permissive environment without an actual state of war. This type of operation is the least military in nature, as it is intended to support an already-agreed-upon peace process as opposed to creating peace through actual military (combat) operations.

It is important to emphasize that this conceptualization of peacekeeping operations, as with the other two operation types, is an ideal type. In recent years, more robust mandates for UN peace operations have shifted actual operations into the area between the ideal types; closer to combat operations and further away from the ideal typical peace operation. It is precisely this tension that the model illustrates.

The third operation type—special operations in the lower right hand corner—is characterized by a lack of attempt at (or even interest in) achieving territorial control. The special operation is also marked by a lack of any police work. As the name suggests, this type of operation is of a different nature, characterized by surgical strikes or pinpoint operations with a short time horizon generally aimed at changing the game at the strategic level, sometimes aimed at bringing about the conditions for success for the other two operation types.

The descriptions of these three basic operation types are of a purely analytical character. These are neither the only types of military operations nor the only way of understanding the relationships between them. The model simply offers a way of systematically relating to the three types of operations and to clarify the relations between them. Similar to Carl von Clausewitz's notion of absolute war, these three operation types are to be understood as ideal types and, thus, as abstractions.

As the triangle highlights the logical space of military operations as defined here, any real world operation will be found somewhere between the three corners of the triangle. The triangle is to be understood as a logically defined space within which military operations can unfold in practice, with mixed forms evolving dynamically over time. Specific military operations include elements from all three operations types. The model also shows how specific military operations can be further understood as intermediate positions between the three corners with different characteristics and conditions.

The operations triangle is not linked specifically to MOUT, as the distinctions apply in principle to any operational environment. In principle, the distinctions apply to any operational environment. They are, however, especially accentuated when the operational setting is a city due to the difficulty in establishing territorial control and carrying out combat operations, just as there is more police work in urban environments. Altogether, the model enables a more systematic understanding of the challenges facing the military organization when the usual dividing lines between the civilian-military spheres are crossed and when the city's dense topography challenges deep-seated military intuitions.

DIMENSIONS OF URBAN OPERATIONS

This section applies the operations triangle to the urban environment. The analysis provides an overview of the relationship between the different types of problems, conditions, and challenges in the urban environment.

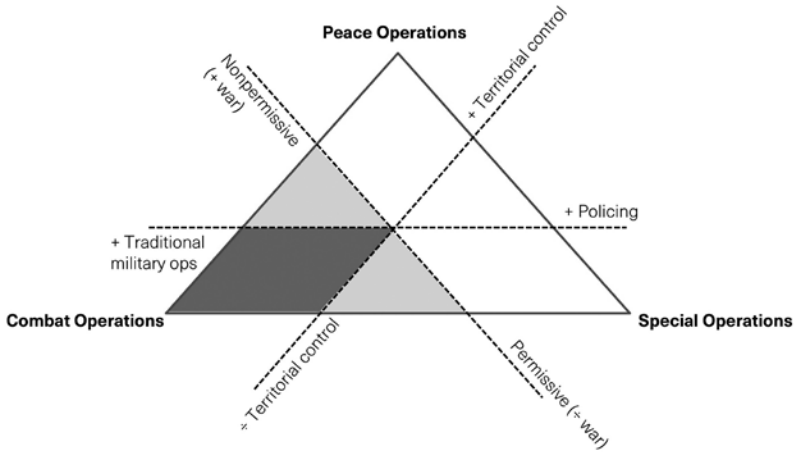


Figure 13.2 Combat operations.
Illustration by MCUP

Combat Operations

With combat operations, we find ourselves in the part of the operations triangle corresponding best to the traditional understanding of actual war as illustrated by the dark gray parallelogram in figure 13.2.

In an urban environment, combat operations are often of a particularly harsh and bloody nature, which is in stark contrast to contemporary expectations regarding limited damages caused by military operations to civilians and civilian infrastructure.[13] The urban operational environment favors the defender, whether they are irregular and poorly organized rebel forces with low-tech light firearms and antitank weapons, better-organized and state supported urban guerrillas with access to more advanced weapons systems and military (e.g.,

[13] See, for example, Neta C. Crawford, *Accountability for Killing: Moral Responsibility for Collateral Damage in America's Post–9/11 Wars* (Oxford, UK: Oxford University Press, 2013).

self-seeking ground-to-air missiles, sophisticated antitank weapons, and access to real-time satellite imagery of the battlefield), or well-organized and well-equipped conventional military forces with access to the entire range of (more modern) military capabilities.[14]

The urban operational environment places extra pressure on all of the elements in an intervening Western military force. From a military perspective, the multidimensional urban terrain is confusing and provides the defending force with almost unlimited opportunity to hide and appear anywhere at any time. The impact of the weapons systems on both sides of the conflict are reinforced—inadvertently and negatively—when projectiles ricochet uncontrollably along roads and walls and the shock waves from detonated grenades cast deadly fragments of bricks and glass. Urban combat operations are therefore one of the (if not the) most unprofitable, loss-producing forms of military operations. Add to that the difficulty of attacking through narrow windows and staircases and carrying wounded personnel and supplies up and down stairs and along streets and alleyways that dictate movements and create natural ambushes or are often blocked by collapsed buildings, traffic accidents, or other barriers.

Finally, it is important to remember the civilian population that has been unwilling or unable to leave the city and that the city's critical infrastructure must be maintained to the extent that, when the fighting is over, the city can promptly return to business as usual. This further limits the maneuverability of the military, just as it strains the military resources in the form of logistical capacity and supplies of food, water, medicine, and so forth. The urban environment adds extra challenges to the sum of what the military force must be able to handle during a combat operation to realize the objective of gaining territorial control. This means that the price of this particular kind of operation will inevitably be high, both in terms of resources and human life.

Even so, actual combat operations can be necessary to establish

[14] David E. Johnson, *Hard Fighting: Israel in Lebanon and Gaza* (Santa Monica, CA: Rand, 2011), 171.

territorial control over nonpermissive urban terrain.[15] Multidimensional urban terrain and protecting the civilian population and infrastructure involves challenges that mean that military success requires not only the use of considerable resources, a very favorable balance of power, and access to advanced, integrated military technologies and networks but also extensive preliminary analysis of the city system. The latter is necessary to know how to isolate the enemy most effectively, how to minimize losses to forces and civilians as well as collateral damage, and to get an idea of how the city's subsystems can be turned against the enemy. Such broad operational planning can render it necessary to carry out further operations, such as acquiring intelligence or evacuating civilians in connection with actual combat operations to ensure the survival of the city during and after the combat. This further increases the total cost and duration of an operation. Few countries (primarily the United States) possess the full range of military capabilities required to carry out an urban combat operation independently. And even with the necessary resources and military capabilities, combat operations in urban terrain will inevitably be associated with the massive loss of human life, and the price will therefore in all respects be high, including politically.

Special Operations

In contrast to combat operations—classic, ordinary military operations—special operations are avant-garde military operations that, as the name indicates, are of a different nature and carried out as so-called pinpoint operations or surgical strikes in a more general military context. Special operations are not to be understood solely as being formally associated with special ops forces, just as combat and peace operations are not the exclusive domain of separate military forces.

[15] According to the *Counterintelligence Glossary* from the Office of the Director of National Intelligence, *nonpermissive urban terrain* refers to "an operational environment in which host government forces, whether opposed to or receptive to operations that a unit intends to conduct, do not have effective control of the territory and population in the intended operational area (Uncertain Environment); or an operational environment in which hostile forces have control as well as the intent and capability to oppose or react effectively to the operations a unit intends to conduct (Hostile Environment)."

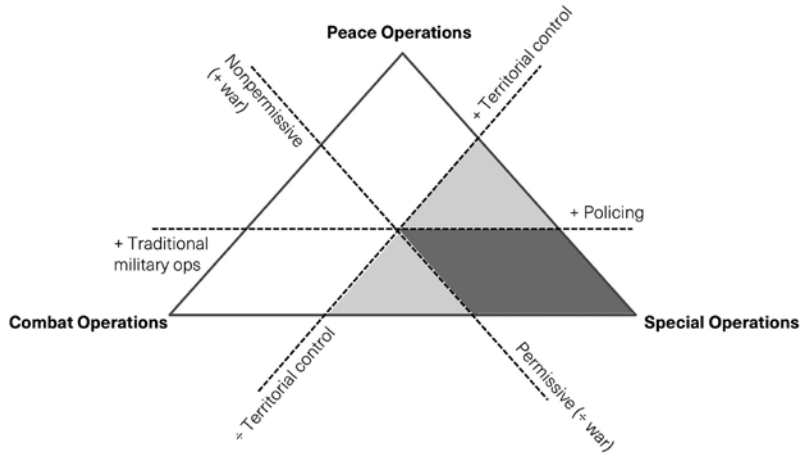


Figure 13.3 Special operations.
Illustration by MCUP

Instead, the model shows how the operational environment will challenge conventional forces to think and act like special forces.

As illustrated in figure 13.3, the fundamental characteristic of special operations is that territorial control is not a factor. Instead, this operation type is characterized by being of smaller scale in time and space (hours or days), but nevertheless aimed at achieving a major impact on the strategic level—usually in secret—by deploying a small but specially trained and equipped unit with great precision.[16]

Special operations are typically about gathering intelligence, reconnaissance (behind enemy lines) for use in connection with the planning of future combat operations, and the actual infiltration and elimination or capture of capabilities and persons of major military-strategic importance. Special operations also have come to include a broader range of operations with a specific purpose, such as

[16] Iver Johansen, "Special Operation Forces: A Weapon of Choice for Future Operations?," in *Military Operations in the 21st Century: Global Trends and the Future of Intervention*, ed. Per M. Norheim-Martinsen and Tore Nyhamar (New York: Routledge, 2015), 99.

antiterror operations, support to foreign governments in connection with, for example, fighting rebel forces (including support to another state, such as foreign internal defense), the evacuation of noncombatants from crisis and war zones, and the liberation of hostages.

Finally, it is possible to distinguish between offensive special operations in which special forces are directly involved versus indirect special operations in which the contribution consists of developing the military capabilities of local forces.[17] Cooperation with local security forces can include the option to call in air support (forward air control), developing capabilities and embedded contributions to operative units (train and advise or train, advise, and assist). In that sense, what is unique about special operations is not that they are designed to conduct one particular task but rather that they can be used to carry out a broad range of specialized and hazardous tasks that lie outside the capabilities of traditional forces.[18] However, special operations will usually be planned and carried out in close cooperation with the various forces, as conducting operations in practice requires Service-specific capabilities in connection with logistics, transport, and air support.

As highlighted above, achieving and preserving territorial control are in themselves demanding challenges that become more difficult in an urbanized environment. As this is not the aim of special operations, they require far less equipment and fewer personnel, meaning that this kind of operation is far less costly. That is not to say there are not challenges and costs associated with conducting special operations in urbanized environments, but removing territorial control from the equation greatly reduces costs in relation to other operation types, particularly in relation to combat operations.

The increasing urbanization of vast territories outside of traditional state control and reach basically means that the security work that intervening forces might wish to undertake is largely pushed down to the right corner of the triangle to a much greater extent than was

[17] Johansen, "Special Operation Forces," 99. The indirect variant is not treated in this section.
[18] Johansen, "Special Operation Forces," 98.

previously assumed in traditional military doctrine. This is due to the massive amount of resources required by the combination of, on the one hand, the absolute growth of the urban environments and, on the other hand, the force sizing requirements for security operations that compare to the population size, not the enemy forces. Even Western military efforts in urban environs in the Global South that were originally conceived in conventional terms will therefore likely be pushed in the direction of operating without territorial control. This is not to say that they are supposed to operate in the same manner or based on the same doctrines as special forces, but rather that the conventional military force is facing a serious conceptual challenge. Western military forces are challenged to reorient within the framework and conditions that traditional special forces are subject to.

In addition to being characterized by the lack of any attempt at seeking territorial control, special operations are characterized by exclusively attending to tasks of a military nature and not taking place in an actual state of war, even though the environment in which special forces operate will usually be hostile and politically sensitive. As a result, special operations do not have the same need as the other operation types to coordinate military and civilian measures; compared to the more comprehensive combat operation, special operations do not typically involve the same amount of fighting. The challenges tied to combat activities will be relatively limited when dealing with special ops. It is not uncommon, however, for special operations to be carried out as an active part of combat activities in connection with a major conventional combat operation, such as in Iraq and Afghanistan, where special forces were deployed to eliminate the leaders of rebel groups and to pinpoint targets for air strikes.[19]

Similarly, special forces occasionally lose their cover in the course of an operation and are forced to engage in hard, direct combat, as was the case when American special forces eliminated Osama bin Laden in Pakistan. In such situations, as illustrated in the lower

[19] *Special Operations*, JP 3-05 (Washington, DC: Joint Chief of Staff, 2014), I-6, I-10; and David E. Johnson et al., *The 2008 Battle of Sadr City: Reimagining Urban Combat* (Santa Monica, CA: Rand, 2013).

light-gray triangle in figure 13.3, the special operation, as it takes place in an actual state of war, is confronted by a number of the same challenges described above in connection with major combat operations. Similarly, traditional special operations involve training and the development of capabilities, which can take place within the entire triangle. For example, special operations can contribute to policing-related efforts to stabilize a situation in the upper light-gray triangle in figure 13.3. Here, special operations face some of the same challenges mentioned above in connection with peace operations.

While there can be great variation in the kind of work carried out within the many types of special operations, there are common features that give rise to a number of general challenges when a special operation is confronted by an urban system.[20] For most special operations, the clandestine nature of the operation is crucial so that the enemy is caught off guard on their home turf. It is more difficult, *ceteris paribus*, to keep such an operation secret if it is to take place in the middle of a city with 500,000 residents as opposed to open terrain, because it is more difficult logistically to transport and deploy forces close to the objective without being detected and because—even if the forces are successfully deployed—there will subsequently be a significantly greater risk of detection due to the population density. The multidimensional physical terrain of the city complicates the practical deployment of special forces, while the population density poses constant risk of being exposed. If special forces manage to go undetected, the operation will nevertheless still be challenged by having to operate in the complex physical terrain of the city, which therefore requires thorough previous knowledge. In contrast to both combat and peace operations, special ops do not have to grant the same considerations to the other systemic elements of the city—to protect the city's infrastructure and living conditions—as the operation has a narrow objective, limited in time and space without seeking to influence the city's systems in the longer term. Conversely, having an impact on infrastructure (protection, contribution to rebuilding or

[20] For a more comprehensive list, see *Special Operations*, 10–11.

construction, or destruction) can be a significant element in nonterritorial involvement with the local political network as a step toward establishing political control. Comprehensive, robust intelligence, including on the political situation and history, is just as essential a condition for success for special operations as for the other operations.

Should a special operation be exposed, the special forces typically find themselves in a combat-like scenario and might well have to nevertheless deal with some of the challenges tied to the city system, including limiting civilian losses and minimizing the damage to critical infrastructure. This consideration, together with a possible lack of familiarity with the physical terrain, can limit the capacity to provide effective support to the operation, such as air support. Moreover, even if the special operation is carried out with support from other Services, the special forces—unless the operation is part of a conventional combat operation—will often find themselves alone on the ground and heavily outnumbered in direct combat. This can necessitate an evacuation that, like the deployment itself, is more complicated and involves more risks in cities than elsewhere due to the complex physical terrain; for example, it might not be possible to land aircraft or even a helicopter. The potential for disaster was demonstrated in the failed 1993 special operation in Mogadishu in support of UN humanitarian efforts, where two Black Hawk helicopters were shot down, American elite soldiers were cut off from their base, and a large-scale evacuation became necessary, ultimately resulting in 84 wounded and 19 dead American soldiers.[21]

Special operations are usually conducted as surgical strikes over a short period of time with small, specially trained units. The costs associated with such operations are therefore relatively limited compared to other ideal typical operations. The objectives that special operations are used to complete vary significantly, and special force members must therefore possess extremely varied skillsets from the acquisition of information and reconnaissance to the elimination and

[21] Johansen, "Special Operation Forces," 102–3.

capture of persons and capabilities to the liberation of hostages and evacuation of noncombatants. The challenges involved when conducting special operations in cities primarily relate to the complex urban terrain, which complicates deployment, the operation itself, and subsequent evacuation. Moreover, the high population density entails increased risks of being discovered and exposed to the enemy.

The challenges related to maintaining the city as system, including the standard of living for local residents and urban infrastructure, are basically nonexistent due to the limited nature and scope of most special operations. When planning such operations, it is therefore crucial to map the geographical position of the target, the surrounding physical terrain, and enemy positions, which is achieved most efficiently using live-streaming technology, typically drones or satellites. This information is usually provided to the special forces in real time during the operation. Similarly, it is necessary to possess modern communications technology that enables the forces to communicate covertly, intercept enemy communications, and maintain ongoing contact with the unit that is coordinating the support capabilities. Finally, special operations require access to the full range of support capabilities (from Army, Navy, and Air Force), and to be able to use such support in an effective and coordinated manner in connection with deployment and evacuation, and air support demands close collaboration between the Services.

Finally, the special operations corner of the triangle is also relevant because it challenges us to consider whether it is possible to have the same ambitions as in the two other corners about achieving long-term security policy objectives when one's presence is significantly smaller.

Peace Operations

Peace operations represent the least military type of operation and, as illustrated in figure 13.4 in the top of the operations triangle, are characterized by full emphasis on policing (rather than fighting) and maintaining territorial control over a permissive environment. In situations where Western military involvement can be considered, the territorial control will typically be fragile, possibly based on a peace agreement

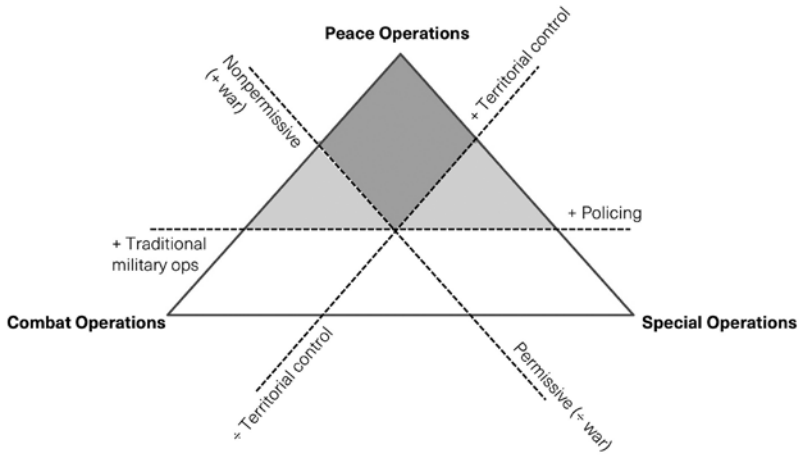


Figure 13.4 Peace operations.
Illustration by MCUP

between formerly warring parties, and the aim of the peacekeeping operation is therefore to ensure the implementation and maintenance of the negotiated peace.

Just as with the two others, this position is naturally an abstraction. Both parts can exist momentarily in time and space, but only intermittently and locally. Because the peace operation is furthest from the two other corners in the triangle—furthest away on the scale from traditional military operations to policing—this is also where we are furthest from the traditional military self-understanding, which is defined by combat.[22] Even so, this is still a type of military operation. In general, there is a need for military capabilities to deliver security on the level immediately below an actual state of war. The UN's role in peace operations since World War II is an example.

With the UN as the representative of the international community,

[22] Antulio J. Echevarria II, *Reconsidering the American Way of War: U.S. Military Practice from the Revolution to Afghanistan* (Washington, DC: Georgetown University Press, 2014).

a need emerged for independent mediation, including peacekeeping efforts. Peacekeeping operations are defined in Chapter VI in the UN Charter, which deals with the peaceful settlement of disputes in which formerly warring parties can opt for a peacekeeping operation to ensure that already signed agreements regarding peace agreements and truces are respected and implemented.[23] Here, the fundamental principle is, generally, that the parties in the conflict agree to the operation. This kind of traditional peacekeeping operation is usually carried out as a UN operation or under the leadership of regional organizations with a mandate from the UN (e.g., the African Union, NATO, or the EU). A peace operation typically includes both military and civilian instruments, such as military units, police, and civilian specialists and advisors. In this context, the military instrument typically consists of lightly armed, clearly marked units that are as visible as possible with respect to toning down the military profile while simultaneously acting as a neutral go-between in relation to the formerly warring parties. In connection with a peace operation, the military instrument is usually subject to extremely strict rules of engagement. Military personnel will therefore usually only use armed force in self-defense or to maintain the operation mandate.

In the course of the 1990s, the growth in the number of peacekeeping operations and increasing involvement of the global community in conflicts between and within states increased the political pressure to be able to intervene earlier in conflict cycles to change and end them. Accordingly, the use of more robust mandates under Chapter VII from the UN Charter, which allows for the use of lethal force, has become much more widespread.[24] Former UN General Secretary Kofi A. Annan's involvement and the Brahimi Report in 2000 pushed the general debate in the UN system concerning formal sovereignty in the direction of that which has since assumed the form of "Responsibility to Protect (R2P)" and General Secretary Ban Ki-moon's efforts to reform the humanitarian

[23] "Chapter VI: Pacific Settlement of Disputes," in *Charter of the United Nations and Statute of the International Court of Justice* (New York: UN, 1945), articles 33–38, hereafter *Charter of the United Nations*.
[24] "Chapter VII: Action with Respect to Threats to the Peace, Breaches of the Peace, and Acts of Aggression," in *Charter of the United Nations*, articles 39–51.

system in the direction of increased political involvement in transforming the sources of suffering.[25]

In connection with UN peace operations, focus has also increased on the protection of civilians to the extent where it is now an integrated part of the mandate for the mission (e.g., in South Sudan and Afghanistan).[26] In other words, the international community is generally moving toward a broader acceptance of the idea that all forms of involvement—to be as humanitarian as possible in the strict sense of the word—also must be fundamentally political. In this sense, the changes made to the framework of the peace operations are in accordance with a major shift in the framework for the involvement of UN organizations in conflicts and vulnerable states. The process has yet to be completed and is sensitive and controversial in many ways, but the combination of population growth and urbanization in the Global South, together with the development of the UN's ambitions for more direct political action, will over time further emphasize the relevance of the peace operations in urban environments.

The work with peace operations includes the traditional observation and monitoring of the peace agreements and truces, ensuring buffer zones, patrolling, controlling access to the border between the territories of formerly warring parties, presence in connection with voluntary disarmament processes, and maintaining general law and order. All of this is more difficult in an urban environment, partly due to the unmanageable terrain of the city and partly because the peacekeeping force, due to the population density, is at greater risk of being challenged by hostile actors (or spoilers) who will potentially be able

[25] Kofi Annan, "Two Concepts of Sovereignty," *Economist*, 16 September 1999, 1–2; Lakhdar Brahimi et al., *Report of the Panel on United Nations Peace Operations* (Brahimi Report) (New York: UN, 2000); Ban Ki-moon, *One Humanity: Shared Responsibility—Report of the Secretary-General for the World Humanitarian Summit* (New York: UN, 2016); and Alex J. Bellamy and Charles T. Hunt, "Twenty-first Century UN Peace Operations: Protection, Force and the Changing Security Environment," *International Affairs* 91, no. 6 (2015): 1,277–98, https://doi.org/10.1111/1468-2346.12456.

[26] *OHCHR, Human Rights and the Protection of Civilians in Peacekeeping: Approaches, Methodologies and Tools* (Geneva: UN, 2015); and Jonathan Gilmore, *The Cosmopolitan Military: Armed Forces and Human Security in the 21st Century* (London: Palgrave Macmillan, 2015). See also, "Protecting Civilians," UN Peacekeeping.

to threaten or destroy the basis for carrying out the operation. In addition to the parties themselves, including formerly warring military units, these actors will typically be organized criminal networks or other hostile groups that have no interest in creating or maintaining the emerging order.

As emphasized above, these groups may be able to change the conditions concerning a permissive environment and territorial control, thereby creating new challenges calling for alternative and more heavy-handed solutions. For example, if the operational environment changes from permissive to the opposite—as illustrated by the transition from the light gray triangle to the left in figure 13.4—the operation will involve far greater risk, and it becomes necessary for the peacekeeping force to carry out offensive peacemaking activities to force the situation up into the dark gray parallelogram. In that case, the challenges involved in the peace operation will be reminiscent of some of the challenges related to the combat operation. Similarly, if it is not possible to maintain territorial control—as illustrated in figure 13.4 by the light gray triangle to the right—the challenge will initially be to pacify and stress the criminal networks and other nonstate actors that might possibly have gained control over slums or ghettos.

Security forces can play an important role with respect to addressing such conflict scenarios. But their operational base is complicated by the fact that their efforts are closely linked to the broader question about how the international community and the Western state model (that builds on and requires unambiguously legitimate power, positive law, and sovereign control over territory and population) are put in play in situations with far more ambiguous, traditional authority structures and partial and otherwise troubled local security forces. There is also a risk that the room for maneuver available to the peacekeeping forces is limited by a narrow mandate and especially by insufficient military capabilities and will therefore be unable to deal with and quickly adapt to a negative development in the conflict situation. This occurred during UNOSOM I and II in Somalia in the early 1990s and the NATO Kosovo force in 2004, where a combination of formerly warring parties, criminal elements, and angry population groups destroyed or threatened to destroy the basis for carrying out

the operation via violent attacks on one another and/or the peacekeeping forces. In both cases, the conflicts revolved around urban environments and the security forces lacked the necessary personnel, mandate, and military capabilities to handle the new, acute situation.[27]

Peace operations in urban environments are challenged by the same conditions as combat operations, particularly with respect to the complex terrain and high population density. Protecting a fragile peace and control over a city will therefore initially require operations with particularly robust personnel quantities. Since the size of the forces should be set in relation to the local population, many of the world's cities are already too large for Western security forces to control. In terms of capabilities, the operations must be able to switch between the original peaceful purpose, where the focus is primarily on police work, and the ability to withstand major challenges, such as massive urban uprisings and violent riots that threaten the operation. At worst, the security forces should be able to fight to get back on track within a carefully specified, situation-adapted framework for exercising force.[28]

Finally, peace operations in cities, particularly in the Global South, will clearly have to be able to understand, analyze, and address spoilers, such as organized criminal elements and the challenge from groups in the population in larger slums outside of state control. This places great demands on prior and ongoing intelligence gathering and analysis, just as it will be crucial for the military organization to think and act across the most basic distinctions that define an orga-

[27] Paul F. Diehl, "With the Best of Intentions: Lessons from UNOSOM I and II," *Studies in Conflict & Terrorism* 19, no. 2 (1996): 153–57, https://doi.org/10.1080/1057610960843 6001; and *Collapse in Kosovo*, Report No. 155 (Brussels, Belgium: International Crisis Group, 2004): 44–52.

[28] James Cockayne, "The Futility of Force?: Strategic Lessons for Dealing with Unconventional Armed Groups from the UN's War on Haiti's Gangs," *Journal of Strategic Studies* 37, no. 5 (2014): 736–69, https://doi.org/10.1080/01402390.2014.901911; Charles J. Dunlap Jr., "The Police-ization of the Military," *Journal of Political and Military Sociology*, no. 27 (Winter 1999): 217–32; Kristian Hoelschera and Per M. Norheim-Martinsen, "Urban Violence and the Militarisation of Security: Brazilian 'Peacekeeping' in Rio de Janeiro and Port-au-Prince," *Small Wars & Insurgencies* 25, nos. 5–6 (2014): 957–75, https://doi.org/10.1080/09592318.2014.945636; and Christoph Harig, "Synergy Effects between MINUSTAH and Public Security in Brazil," *Brasiliana–Journal for Brazilian Studies* 3, no. 2 (March 2015): 142–68, https://doi.org/10.25160/v3.i2/d6.

nization's work and self-perception, namely the difference between combat and policing. Overall, peace operations in cities are resource heavy, and Western decision makers will increasingly have to get used to the fact that some cities are so large that it will be practically impossible to stabilize them.

Dynamic Operational Mixing: Stabilization

Because the operations triangle consists of a space defined by three vectors, each position inside the triangle represents a combination of operational efforts in a given moment. As these change over time, actual operations—planned or executed—can be envisioned as movements across the triangle. This could be from a focus on warfighting to policing or from a large conventional footprint to a light special operations one.

The triangle therefore also enables us to depict large stabilization operations, such as those in Iraq and Afghanistan. Stabilization operations are by definition multidisciplinary. Unlike the three ideal-type military operations presented above, they do not tie specifically to any one set of either military or civilian instruments. Stabilization is instead achieved via interagency efforts, such as civil-military cooperation, which can be defined as an integrated approach in which all of the authorities or parts of an organization (e.g., the UN) actively support a given set of stabilization efforts and work together toward a commonly defined stabilization objective. This includes cooperation on planning, implementation, and gathering intelligence in connection with efforts related to politics, economic development, and security.

Integrated stabilization efforts can take place before, during, and after a conflict. The military instrument is merely one of many that can be applied in a given situation. While the stabilization operation can be seen in a narrow perspective, this operation type characteristically draws on both military and civilian instruments to create and subsequently maintain a measure of stability. For example, the sequence can begin with special forces gathering necessary intelligence or eliminating strategically important objectives, which might be followed by carrying out actual battles to defeat and displace the elements at the root of the instability; finally, when the territorial control

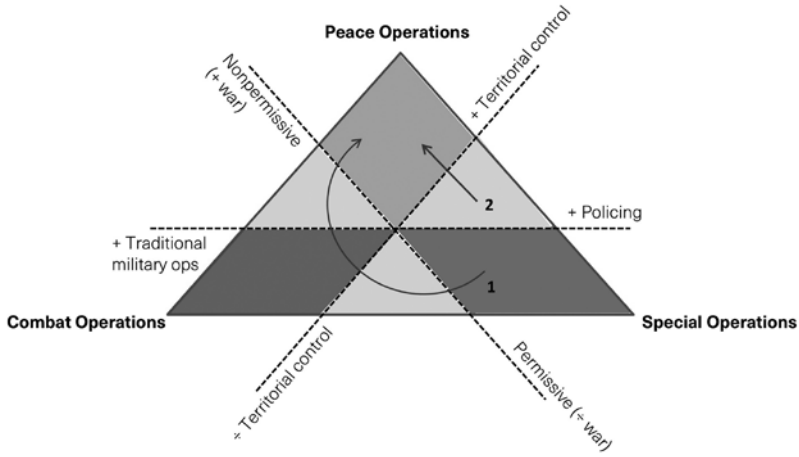


Figure 13.5 Stability operations.
Illustration by MCUP

has been achieved and stability restored, it is maintained largely by policing. The stabilization operation can therefore be understood as a dynamic that—in difficult cases—involves elements from each of the three operation types in the operations triangle.

In figure 13.5, arrow 1 illustrates the dynamic operational mix of stabilization. The movement here is from initial special operations (dark gray parallelogram) to major combat operations (left gray parallelogram) to peacekeeping operations (top light gray parallelogram). Moving left from the dark gray parallelogram to the lower light gray triangle marks the transition from a nonwar state to an actual state of war in which special forces are deployed as an active element in combat operations, possibly as part of an indirect military approach. It is important to emphasize that the arrow merely displays the strategic intent with a gradual transition between forms of action, but the actual operation will often be carried out with a high degree of concurrency with respect to the instruments.[29]

[29] Henrik Ø. Breitenbauch, *Uendelig krig?: Danmark, samtænkning og stabilisering af globale konflikter* [Infinite war: Denmark, the conception and stabilization of global conflicts] (Copenhagen: DJØF Forlag, 2015).

Dynamic Operational Mixing: Policing

In addition to the stabilizing dynamic, the operations triangle gives rise to an alternative dynamic relating to police work in a permissive urban environment. In such an environment, it is possible to present two scenarios for performing a police mission (see figure 13.5).

First, slums or ghettos outside of conventional territorial control may constitute a security problem as a hotbed for criminal gang activity, drug trafficking, and/or corruption, which will be a constant source of instability. This problem scenario is the upper right, light gray triangle in figure 13.5. Inasmuch as the source of the problem is intrastate, with respect to the separation of military and police activities, the reestablishment of law and order is police work. The police face a dilemma, however, as the territorial control over the area that is required for normal civilian policing is lacking and the instruments available to the police are often insufficient. The local police might also be part of the problem, as in cases where the police perpetrate torture or other abusive treatment or are involved in corruption with local criminal elements. Such a set of problems requires mixed capabilities in the form of, for example, constabulary forces. The obvious challenges here are that classic police work and police forces become militarized. In the worst case, such constabulary forces take the form of private and semiprivate death patrols, which obviously does not contribute to the creation and maintenance of legitimate order. Conversely, if legitimate territorial control is established, the scenario for police-related work shifts from the upper right, light gray triangle to the top darker gray parallelogram, as illustrated by arrow 2 in figure 13.5. Here, the need to pacify criminal networks and nonstate actors is replaced by the need to ensure the construction of a legitimate police force that is capable of maintaining law and order in its territory without succumbing to corruption.

A significant element in a peace operation in a city lacking an effective and legitimate police force is therefore to contribute to the development of such capabilities, as seen in the example of the national police in Haiti, particularly in the capital Port-au-Prince. The contribution made by the Brazilian Army to pacifying and stabilizing Port-au-Prince within the framework of the UN Stabilization Mission

in Haiti (MINUSTAH) offers an example of a conventional force that has proven capable of flexibly and in a controlled manner adapting to different levels of conflict while cooperating with civilian authorities, international and local alike. In that sense, it is also an example of how military operations in cities instinctively challenge the distinctions between traditional military operations and politically oriented policing.[30]

A fundamental and coinciding challenge when an outside Western actor is facing the policing-stabilizing problem are the tacit assumptions concerning political order upon which the operational planning and practice are based. Western actors, including military actors, are formed by a specific political order. This is typically a single political authority with checks and balances, a unified legal system based on positive law, and therefore relatively clear legal, economic, and political rules and opportunities for legal recourse. By projecting this type of order with its built-in assumptions into the foreign operational environment, the intervening actors risk building on erroneous assumptions concerning the rational room for action available to the local actors and their set of values. The perception will be that order can and should be established on formal foundations; that is to say, it is based on a centralized, state-run, and vertically integrated enforcement of law and order even when local conditions do not fit such a way of operating.

The city as phenomenon, particularly in the Global South, is often characterized by a blurring of the division between the formal and informal and a multiplicity of self-organized horizontal authorities outside of the control of the state.[31] One such example is found in the transport sector in Nairobi, Kenya, which in the absence of an effective state apparatus is regulated by an organization that requires payment for, among other things, the protection of the roads and traffic. In Western eyes, this seems illegitimate and would be regarded as a kind of blackmail or extortion; in reality, it works, is broadly accepted by the local population, and in practice is essential for the Kenyan capital to

[30] Hoelschera and Norheim-Martinsen, "Urban Violence and the Militarisation of Security"; and Harig, "Synergy Effects between MINUSTAH and Public Security in Brazil."
[31] Warren Magnusson, *Politics of Urbanism: Seeing Like a City* (New York: Routledge, 2011).

be able to function.[32] Another example is the increasingly widespread use of private security companies to maintain law and order—the responsibility of the state in the Western context.[33] Being open to the existence of alternatives to Western models of order is therefore an important condition for being able to understand and possibly influence the urban system, including by military means.

In contrast to well-functioning, small Western cities and relatively homogenous demographics, well-functioning public systems, controlled urban planning, quality construction, and relatively limited social inequality show that the urbanization of the Global South is far more complicated in the sense that it is largely uncontrolled and unplanned. Cities are growing in places and in ways that have not been planned or even anticipated on the periphery of the existing urban environment. Without effective urban planning, residents are neither formally recognized nor are their practical needs met in the form of access to social services or basic infrastructure, such as sewage, utilities, or public transport. In that sense, the rapidly growing cities in the Global South are part of a process in which the pressure on already limited resources is exacerbating the problems, further accentuating the tensions between formal state and informal social relations and power structures. The result is seen in such megacities as Dhaka in Bangladesh and Lagos in Nigeria, which are marked by explosive growth, rudimentary infrastructures, massive social inequality, underdimensioned—and corrupt—public systems, and enormous slums.

Exerting positive (peaceful) political influence in these kinds of urban systems in developing countries—let alone controlling them—is almost impossible. The governments and city councils are already failing (by Western standards) in this regard in normal, everyday situations. This is important to remember when considering the challenges

[32] Jacob Rasmussen, "Inside the System, Outside the Law: Operating the Matatu Sector in Nairobi," *Urban Forum* 23, no. 4 (2012): 415–32, https://doi.org/10.1007/s12132-012-9171-z.

[33] Rita Abrahamsen and Michael C. Williams, "Security beyond the State: Global Security Assemblages in International Politics," *International Political Sociology* 3, no. 1 (2009): 1–17, https://doi.org/10.1111/j.1749-5687.2008.00060.x.

resulting from exceptional political issues in the same environments, including security challenges. Clausewitz's central warning about not viewing war as anything other than what it is can be expanded here to the entire operational environment: pronounced Western operative preferences for a specific kind of order constitute an important strategic risk with respect to understanding, planning, and operating in urban environments, particularly in the Global South.

CONCLUSION

The percentage of the world's population living in cities is increasing. By 2050, two-thirds of the world's population will live in cities, especially in the Global South. When people move to the city, conflicts do as well. Urban environments are notoriously difficult for military forces to operate in given that the urbanized terrain prevents situational awareness and provides opportunities for ambushes, the population density increases the risk of collateral damage and losses, and the critical infrastructure is particularly vulnerable. If Western military forces are to maintain or strengthen their capacity to carry out military interventions that are operationally and politically effective and at the same time legitimate, it is necessary to think hard about urbanization and its consequences for military operations. In this chapter, we have introduced a model for an operations triangle. This model offers a simplified but systematic perspective on the challenges facing urban operations from a Western perspective.

In the operations triangle, each corner represents a type of military operation: combat operations, peace operations, and special operations. Like Clausewitz's absolute war concept, these are ideal types that do not exist in reality. Instead, any actual military operation can be plotted somewhere in the triangle as a trade-off between the three corners. Operation types are to be understood as generic activities that a military force can be more or less optimized to go about; in that sense, a certain branch of the military does not "own" a particular corner.

Absence of legitimate and effective governance structures means that stabilization and policing to establish and support such structures will be in demand, but the conditions on the ground mean

that all operations may be necessary. A combination of combat, special, and peace operations will likely be required for normative political reasons. Accordingly, it will be necessary for the military force to have the ability to dynamically shift modus between the operation triangle's different operational requirements.

Western military interventions will consist of a dynamic combination of all three operations. MOUT's distinctive features challenge the three types in different ways and, at the same time, are prisms for the challenges facing Western military forces in general. Western strategic expectations regarding political efficiency generate interest in Western forces usually having to contribute to stabilization, leading operative dynamics from combat operations to peace operations. As force sizing for peace operations is measured against the local population rather than the enemy force, growing cities in the Global South will often make it difficult and often outright impossible to muster the required force numbers. In this manner, the operations triangle also shows how the Western approach to military operations is pressed down toward the special operations corner of the triangle, which demands a far smaller presence, and does not aim at taking terrain.

The combination of the challenges from the urban physical terrain—and the global growth in cities in general—and local residents, presses the traditional Western military operations down toward the special operations corner of the operations triangle; the operational environment will be extensive and complex and the usual objective of territorial control is therefore often unattainable. In the end, the city is a prism for challenges to the Western way of war. Urban operations challenge our conventional forces to fight in cityscapes, embrace peace-related security tasks, and think more like special forces.

CONCLUSION

The Military Implications of Complex Terrain in Twenty-first Century Urban Areas

Benjamin Jensen, PhD

This book builds on the larger literature addressing the future of military operations in dense urban terrain and megacities.[1] The preceding chapters reflect national security professionals grappling with the changing character of war. Thirteen practitioners, from government civilians to foreign and U.S. military personnel, spent one year in 2015 conducting a series of studies and war games in an effort to understand the complex terrain of the twenty-first century city. The results are published here. Yet, the question remains: What are the military implications going forward?

This concluding chapter will read across these perspectives and offer a series of military implications for the U.S. military and national security enterprise. These recommendations envision suitable, feasible, acceptable, and cost-effective steps officials can take between 2019 and 2025. The inherent trade-off before senior leaders is clear. These recommendations prioritize preparing for smaller-scale contingencies likely to emerge, often on short notice, in the urban littorals over great power competition. The assumption is that, first, the

[1] The study took place one year after the Office of the Chief of Staff of the Army's Strategic Studies Group researched megacities and David Kilcullen's book, *Out of the Mountain*, appeared. These efforts have since grown to include a vibrant research effort at the Modern War Institute at West Point.

most likely contingencies on the horizon will take place in middle- and low-income countries where political stability and economic opportunity are in a death spiral that local elites take advantage of to consolidate power. Where these systemic collapses and power grabs overlap U.S. national security objectives, the military must be prepared to act.

Second, one can assume that great power competition is more likely to resemble proxy war than direct conflict that risks strategic escalation into a nuclear confrontation. If the past is prologue, the new cold wars of the twenty-first century will again play out on the periphery via gray zone competition.[2] Yet, these struggles in the shadows will take place in the complex terrain of the new city. Therefore, the U.S. military and national security enterprise has a responsibility to be prepared to conduct coercive diplomacy campaigns, and more importantly, conflict preventing internal defense and development actions in dense urban terrain and megacities.

The conclusion will establish the military problem and use it to frame a central idea guiding doctrinal, organizational, training, material, leadership, personnel, and facility reforms. These categories reflect the Joint Capabilities Integration and Development System used to evaluate requirements and prospective solutions in the U.S. Department of Defense. The focus here is on doctrine, organization, training, and materiel. Overall, the density and connectivity of the complex terrain in the new city necessitate a new theory of victory and supporting military organizations, capabilities, and integration through training and education.[3] The U.S. government will need interagency task forces able to observe and orient in relation to the overlapping networks of influence and interest that connect local populations often to global social, political, and economic flows. These future task forces will need to operate indirectly, what Sun Tzu called the unorthodox, to amplify key relationships and feedback loops present in the city to avoid large-scale deployments of personnel and equipment that will alter

[2] For an overview of this premise, see Benjamin Jensen, "The Cyber Character of Political Warfare," *Brown Journal of World Affairs* 24, no. 1 (Fall/Winter 2017): 159–82.

the system.[4] When closing with isolated enemy forces, this task force will need low-cost intelligence and precision-strike platforms able to connect to local networks and partners.

These concept and capability changes will require alterations to training and education that stress the ability to think in terms of complex systems and rapidly adjust concepts of operations in the face of new information. They will require that the military profession revisit the systems logic in publications such as *Warfighting* and John Boyd's archival documents to integrate it with Bayesian updating and other big-data techniques.[5] In other words, organizations like the U.S. Marine Corps will need to reimagine maneuver warfare for the density and connectivity of complex terrain on display in twenty-first century cities. They will have to collect larger amounts of data and rapidly assess patterns and trends to ensure they maintain speed to keep adversaries off balance. Information will enable new forms of reconnaissance pull and attack-in-depth, but only if we sufficiently train and educate personnel to operate in a world defined by big data, narrow artificial intelligence, and machine learning applications.[6]

THE MILITARY PROBLEM: DENSITY AND CONNECTIVITY

The preceding chapters illustrate how the density and connectivity of the modern city create a new type of complex terrain. The flows of the

[4] On the indirect approach, see Sir Basil Henry Liddell Hart, *Strategy* (London: Faber & Faber, 1954). On the concept of the unorthodox in Sun Tzu, see Derrick M. C. Yuen, *Deciphering Sun Tzu: How to Read the* Art of War (London: Oxford University Press, 2014).
[5] For an overview of Boyd's work, see Ian T. Brown, *A New Conception of War: John Boyd, the U.S. Marines, and Maneuver Warfare* (Quantico, VA: Marine Corps University Press, 2018). On the practical implementation of Bayes theorem, see Nate Silver, *The Signal and the Noise: Why So Many Predictions Fail—But Some Don't* (New York: Penguin Press, 2015); and Sharon Bertsch McGrayne, *The Theory that Would Not Die: How Bayes' Rule Cracked the Enigma Code, Hunted Down Russian Submarines and Emerged Triumphant from Two Centuries of Controversy* (New Haven, CT: Yale University Press, 2012).
[6] For an overview of big data, see Viktor Mayer-Schönberger and Kenneth Cukier, *Big Data: A Revolution that Will Transform How We Live, Work, and Think* (New York: Mariner Books, 2014). On the existing applications of AI/ML and prospects for the future, see Nils J. Nilsson, *The Quest for Artificial Intelligence: A History of Ideas and Achievements* (New York: Cambridge University Press, 2009); and Max Tegmark, *Life 3.0: Being Human in the Age of Artificial Intelligence* (New York: Vintage Press, 2018).

city can quickly overwhelm even large military forces. Because the city is connected, there is a constant war to define the narrative (i.e., the knowledge-power nexus). This war of influence will take place globally. Even irregular competitors have strategic reach, a phenomenon on display in the campaign against Daesh/Islamic State. As seen in the Russian election hacking efforts in 2016, they can target your citizens (i.e., public opinion, conspiracy theories) and infrastructure (i.e., the information integrity of major social media platforms and trust in the election system itself).[7]

A connected city can certainly generate transient mass. Large flash mobs can assemble on short notice and threaten key avenues of approach, enveloping friendly forces through riots and tying down units needed for other contingencies. Restricted rules of engagement, perpetuated by the larger war of influence, make crowd riot control a difficult, if not impossible, task for traditional military units.

These cities are home to multiple factions with competing interests that create flashpoints for political violence. Contentious politics are fractal. Violence occurs across the city in different sequences, settings, and circumstances but reflects some prevailing patterns. Each city block has its own unique experience. Each group has a distinct array of grievances often mobilized by elites for economic and political gain. There are strange attractors, local warlords, and political bosses bounding power. Mapping these transactional patterns and resulting configurations is the first task of any potential intervention. It must start years beforehand to map how relationships change over time at the local level.

In the complex terrain of the city, policy objectives and military ends fluctuate. Humanitarian assistance missions transform into counterinsurgency within days. Human and traditional security logics blur across the area of operations. As the system changes, missions change. Changing political logics create inherent tensions in military planning resulting in ambiguous ends, restricted ways, and minimal means.

[7] For an overview of the 2016 Russian election hacking effort, see Benjamin Jensen et al., "Fancy Bears and Digital Trolls: Cyber Strategy with a Russian Twist," *Journal of Strategic Studies* 42, no. 2 (2019): 212–34, https://doi.org/10.1080/01402390.2018.1559152.

Warfighting functions experience enduring challenges amplified by the density and connectivity of the complex terrain, while command and control experiences diminishing marginal returns. Units find that they have to add additional nodes in their communication architecture to integrate with local police, municipal services, etc., but each additional link slows the network, comes with security challenges, and complicates the flow of information. Each of these groups creates new coordination challenges and lines of effort, making mass and unity of effort an increasingly difficult prospect.

Likewise, turning the noise of the city into actionable intelligence becomes increasingly challenging. Military units lack the language capabilities or understanding of local dialectics and slang to translate speech into meaning. Even with automated translators, a significant amount of context vital to understanding the population is lost. The population, in terms of the grievances and interests of factions that compromise the city, remains a mystery. Technical challenges limit a unit's ability to integrate social media data with signals and intelligence and conduct source operations in dense urban terrain. Existing security classification issues and a lack of interoperable data standards and trained data scientists in the military limit the ability of a force to create a holistic intelligence picture. They struggle to combine open-source information that captures the changing sentiment of factions in complex terrain with targeted signals intelligence on the pattern of life and motives of key actions. Furthermore, there are cultural and technical limitations to sharing data with the wide range of coalition actors required to maneuver in the city.

Fire and maneuver become costly and restricted in the complex terrain of the city. As seen in Mosul, you have to break the city to take it; a campaign strategy that will not always be available in the future. Cities with high-rise buildings and unplanned, narrow streets make precision fires and mechanized maneuver more difficult, requiring units to dismount and close with the objective in a way that exposes them to tactical risks that can have strategic consequences. When the public sees the death of its legions, however, the appetite for foreign interventions can swing wildly. Ground units maneuvering through the complex terrain of the city often lack practical combined arms options.

In dense urban terrain, aerial and indirect fires tend to only hit the tops of buildings. Therefore, the building must be destroyed versus targeting an individual floor or room. These weapons also tend to be costly relative to adversary offense and defense options. For a fraction of the cost of a single Hellfire missile, an enemy combatant can broadcast a propaganda-themed version of the attack globally via targeted advertising likely to play on key sentiments in different factions. That is, for small amounts of money, they can buy a global audience.[8]

Force protection concerns also limit mobility at the operational level. Urban terrain has a canalizing effect, increasing the risk of complex ambushes at the tactical level that have campaign-level implications. Tension exists between wanting to engage the populace across the area of operations and resupplying/protecting smaller forward operating bases. Furthermore, the golden hour, ensuring you can medically evacuate someone within an hour of injury, becomes tentative in this new complex terrain. Helicopters and ground evacuation are further complicated by the narrow streets, high-rise buildings, and lack of open spaces.

THE CENTRAL IDEA: MAP THE CITY, ACT INDIRECTLY

The size, density, connectivity, and resulting complexity of large urban areas challenge traditional approaches to military operations in cities. A military force cannot isolate or control a densely populated, highly connected population. People either leave the city or remain trapped and prone to shifting loyalties as a means of survival, a dynamic that was on display in multiple military operations in the Middle East between 2004 and 2018.[9] Rather, the goal of urban operations

[8] In fact, every time the United States uses three Hellfires (a common practice) to attack a target, it costs almost as much as the average price of an American family home, which was $376,800 in December 2018. See "Median and Average Sales Prices of New Homes Sold in United States," U.S. Census. The cost per Hellfire missile is more than $115,000, depending on the model and when it was purchased.

[9] Note that shifting loyalties as a means of survival is a logic of political violence identified by Stathis Kalyvas in his research. See, Stathis N. Kalvyas and Matthew Adam Kocher, "How 'Free' Is Free Riding in Civil Wars?: Violence, Insurgency, and the Collective Action Problem," *World Politics* 59, no. 2 (2011): 177–216, https://doi.org/10.1353/wp.2007.0023.

should be to reveal the dominant physical and cognitive feedback loops channeling resources and ideas in a city system. An emphasis on social mapping to reveal these relationships gives units the ability to intervene selectively to reinforce resiliencies in the city or to disrupt malign elements through an indirect approach. By observing and orienting on these human connections, a military—often through its local partners—can turn the population on its adversary or collapse the adversary from within in a way that does not result in the complete destruction of the city.[10]

All maneuver, in seeking to achieve a position of advantage, must start with knowledge of the terrain, local factions, and how they collectively manifest as a system. That is, military operations—from small teams conducting internal defense and development to conventional campaigns—must begin with an understanding of the complex terrain within the modern city. While this sounds so simple and intuitive, the current military is not equipped, mentally or materially, to do so. To that end, the following sections highlight these two key aspects—mapping the city system and acting indirectly—and use the insights to identify new material, organization, and training and education requirements.

Mapping the City

Mapping the city begins with understanding how people connect. These connections form networks. These networks are often shaped by key nodes, which channel resources and ideas, and create powerful elites capable of mobilizing local factions. Therefore, the first job of any interagency team—whether military, diplomatic, or development oriented—is to create a map of these relationships. This mapping can be achieved using existing, off-the-shelf software. Software packages that analyze spatial clusters, a common feature in multiple geospatial analysis tools, and scour social media to assess sentiment scores and other content analytics among targeted populations become key intelligence resources for predicting unrest and identifying resiliencies. That is, mapping a city requires digital foraging: harvesting the

[10] On the importance of human connectivity as a defining feature of modern military operations, see Charles Cleveland et al., *Military Strategy in the 21st Century: People, Connectivity, and Competition* (Amherst, NY: Cambria Press, 2018).

latent signatures of a city to reveal key relationships between the flow of resources and ideas. As Akrama outlines in his chapter, this turn to data-driven analysis parallels the evolution of modern policing and their use of hot spot, predictive, and community policing to identify patterns and trends as well as develop a more contextual sense of local interests.

For example, when analyzing a physical port facility (i.e., SPOD or seaports of debarkation), the routes dock workers take to work each day and where they tend to live based on social media, surveys, and geospatial data must also be assessed. Terrain cannot just be considered in terms of the SPOD to secure. How local networks enable that facility to operate and the lines of communication connecting them must also be considered, which requires an understanding of the population's sentiment in these areas. A flash protest, triggered by false rumors on social media, could block dock workers' access to work or even force them to flee their homes, causing a series of cascading effects. Disrupted lines of communication then slows throughput of the SPOD, causing food insecurity, economic dislocation, and even impacts the ability of a military force to sustain operations and support local partners.

Mapping the city requires thinking of its complex terrain as a system. Complex systems focus on how relationships, with a particular emphasis on feedback loops, between component parts produce emergent effects.[11] That is, unlike a linear system, inputs do not equal outputs. Small changes can produce large consequences that are often difficult to predict in advance.

Multiple chapters in this book highlight the importance of assuming that the city is a system. Simpson builds on the City as System Framework to describe the campaign logic of Daesh/Islamic State.[12]

[11] On systems thinking in general, see Robert Jervis, *System Effects: Complexity in Political and Social Life* (Princeton, NJ: Princeton University Press, 1997). The push for the U.S. Marine Corps in particular to think in terms of systems was a major goal of LtGen Paul K. Van Riper, who even after retirement taught an elective on systems theory at Marine Corps University.

[12] On the city-as-system framework, see Mark Lomedico and Elizabeth M. Bartels, "City as a System Analytical Framework: A Structured Analytical Approach to Understanding and Acting in Urban Environments," *Small Wars Journal* (2015).

Gerbacht sees system effects in the intersection of territoriality and grievances. Factions create new territorial boundaries that reflect their power and past grievances. These shifting boundaries have a significant impact on the complex terrain of the modern city and create information requirements for any task force seeking to shape events therein. Relihan calls for using "social radar" and crowd sourcing to map these systems. Akrama stresses that the resulting intelligence advantage that emerges from mapping this system drives the operations of small, flexible teams required to maneuver rapidly in and out of dense urban terrain.

Reading across the chapters in this volume illustrates the following requirements for U.S. military and/or other actors in the broader U.S. national security enterprise:

- Material
  - Investments in commercial software packages to aggregate and analyze data on social relationships globally, or at a minimum, in key hot spots, including policies and procedures for the use of aggregated data and free software packages such as R and TensorFlow on government networks.
  - Investments in data storage infrastructure, including cloud-based architectures, that allow teams to store aggregated data and maintain a baseline against which to assess emergent patterns and trends in the operational environment; the associated policies and procedures should make it easy—not difficult—to move this data across networks, including sharing with interagency and coalition partners.
- Training and Education
  - Create curricula on basic data science standards and methods as well as systems thinking in professional education that facilitates the proper employment of commercial data aggregation and analysis; the military is not currently optimized to operate in a world of big data much less see complex terrain as a system.
  - Create distributed or resident reading lists on systems thinking that help professionals understand 1) what a system is and 2) how to analyze a system.

In sum, the U.S. national security enterprise and military in particular need capabilities and concepts for aggregating big data and using it to map local systems. Military forces can only start to understand the city system once they reveal its tendency and potential based on the networks that define its boundaries. These networks can be mapped through digital forging, collecting unclassified, often open-source data, on the flow of goods and resources and the connections they illuminate between groups. Yet, the modern military professional is neither educated nor trained to deal with large data flows, nor is the information architecture outside of specialty intelligence applications designed to manage—much less assess—patterns and trends in this data. Military personnel, outside of a small number of operations researchers, lack an understanding of basic statistics or how to operate even the simplest data analysis package, such as Microsoft Excel. They cannot identify patterns and trends much less build basic statistical or narrow AI/ML models to make probable assessments of future behavior in the city system. Put bluntly, the modern military—and much of the larger U.S. national security enterprise at large—is data illiterate.

As a result, the profession clings to outdated analytical techniques and overly weights subjective judgment based on narrow interpretations of historical cases enshrining the great man myth.[13] Rather than deal with facts and tracing them back to possible causes—as Clausewitz recommends in his chapter on critical analysis—the military profession vainly searches for secret logics in the past decisions of great commanders. We look for heroes to justify how we make decisions under the stress and uncertainty that define military operations and, in the process, often slip into unintended biases. Operating in the complex terrain of the twenty-first century city requires first making the U.S. military and national security enterprise data literate.

[13] For an overview of the great man myth, see Robert A. Segal, ed., *Hero Myths; A Reader* (New York: Wiley, 2000). For a defense, see Daniel L. Byman and Kenneth M. Pollack, "Let Us Now Praise Great Men: Bringing the Statesmen Back In," *International Security* 25, no. 4 (Spring 2001): 107–46, https://doi.org/10.1162/01622880151091916.

Acting Indirectly

All of the chapters similarly stress that operations in the complex terrain of the twenty-first century city will require smaller, more flexible force packages that can operate indirectly. The indirect approach is defined by Liddel Hart as one that maximizes surprise and directs its energy toward unexpected locations that throws the enemy off balance. For Hart:

> To move along the line of natural expectation consolidates the opponent's balance and thus increases his resisting power. In war, as in wrestling, the attempt to throw the opponent without loosening his foothold and upsetting his balance results in self-exhaustion, increasing in disproportionate ratio to the effective strain put upon him. Success by such a method only becomes possible through an immense margin of superior strength in some form and, even so, tends to lose decisiveness. In most campaigns the dislocation of the enemy's psychological and physical balance has been the vital prelude to a successful attempt at his overthrow.[14]

In the complex terrain of the modern city, conducting deliberate attacks along narrow fronts will exhaust the offense. The city allows defenders to create obstacle belts, defense-in-depth, and force the attacker to destroy the city to take it, setting the stage for a Pyrrhic victory at best. Given the connectivity, the defender can also envelope the physical attacker psychologically, distorting their advance through social media memes and turning, if effective, segments of the domestic population against their own military. While this did not happen in the 2016–17 Battle of Mosul, likely owing to the efforts of Joint Task Force Ares to isolate Daesh/Islamic State in cyberspace, it is a risk in future urban operations.[15]

An indirect approach also relates to what Sun Tzu called the un-

[14] Hart, *Strategy*, 5–6.

[15] On Task Force Ares, see Michael Martell, ed., *Joint Task Force ARES and Operation GLOWING SYMPHONY: Cyber Command's Internet War against ISIL*, Briefing Book 637 (Washington, DC: National Security Archive, 2018).

orthodox in war.[16] In the *Art of War*, Sun Tzu outlines the relationship between the orthodox, or the military forces arrayed for battle, and the unorthodox, often seen as deception and subterfuge. Traditional sieges are not optimal in classical or contemporary warfare. The sheer amount of forces required to dislodge forces defending in complex terrain creates strategic risk. Therefore, the force that finds creative ways to exploit existing relationships manifest in the territoriality of the city will move with the terrain, not against it. That is, you find ways to amplify key feedback loops and cut off certain relationships to isolate the enemy. An isolated enemy is prone to collapse.

This indirect approach is on display in multiple chapters in this book. At the most basic level, Borley highlights what Richard Sawyer would call the "Tao of deception," or how to employ spies and other means to open fortresses and cities to advancing forces.[17] Her chapter demonstrates an enduring aspect of dislodging defenders in complex terrain: trick them out. Farina illustrates how the connectivity of the modern city creates new opportunities of deception and shaping targeted populations. Spoofing networks, or injecting false information into social media to alter perceptions, offers an innovative way to keep the adversary off balance.

In her chapter, Manning uses insights from the biology of invasive species to develop a concept for symbiotic warfare. Applied to the complex terrain of the modern city, this concept envisions protecting critical infrastructure and key populations to deny your adversary the ability to survive. Put another way, a military must understand the local networks and dominant feedback loops in the city system to isolate the adversary. Once isolated, the adversary—much like the invasive species Manning explores—is denied the information and resources they need to survive. Cutting your enemy off from the networks that circulate resources and ideas in the city, while protecting the larger population's access, creates an entirely new operational logic.

Once the enemy is isolated, multiple chapters specify how to

[16] On the unorthodox as a defining feature of Chinese strategy historically, see Ralph D. Sawyer, *The Tao of Deception: Unorthodox Warfare in Historic and Modern China* (New York: Basic Books, 2007).
[17] Sawyer, *The Tao of Deception*.

attack their critical vulnerabilities. First, maneuver is both physical and cognitive, integrating operations in the information environment seamlessly with more orthodox offense, defense, and stability tasks. Achieving a position of advantage requires balance. As Johnson and Markel illustrate in their chapter on the Battle of Sadr City, the simultaneous combination of offense, defense, and stability was the key to victory. Closing with the enemy in complex urban terrain requires isolating the adversary and protecting the population. There is no city without the populace. There is no intelligence without groups and subgroups connecting to generate flow in the city. As multiple separate studies show, these interactions generate information and the military force that best accesses this information achieves a position of advantage.[18]

Multiple chapters also develop the concept of attacking points of manipulation with joint combined arms. Points of manipulation are network connections vital to the adversary's ability to operate in the complex terrain of the city. Put in center of gravity analysis terminology, they are critical requirements. The objective of maneuver, both in the physical and cognitive sense, is to either neutralize or shape these points of manipulation to throw the enemy off balance. That is, you either deny the enemy illicit sources of finance or coopt the criminal networks to isolate them. Once again, understanding these networks and isolating them drives operational design and tempo. Even if the objective is to neutralize a point of manipulation the adversary relies on, every effort is made to protect the population of the city and limit cascading effects. In this way, when force is used, the preference is for a local partner to be in the lead supported by joint fires and intelligence, a dynamic on display in the campaign against Daesh/Islamic State.

Second, operating in the complex terrain of the city creates new organizational and capability requirements for the U.S. military and national security community. With respect to organizational design, both Akrama and Frerichs note that the military force operating inside the city must be smaller, more flexible, and able to integrate with in-

[18] Cleveland et al., *Military Strategy in the 21st Century*.

teragency and Coalition partners at a lower level. Frerichs calls this approach distributed influence.

These teams will also need organic fire support assets that help take advantage of windows of opportunity to attack isolated adversaries. Fires in this respect favor precision over mass and need to be coordinated at the company level and in support of distributed Coalition and interagency teams.

There is still the question of how to build a C4ISR network to support this fires plan and maintain the type of intelligence collection at tactical levels required for developing pattern of life data and limiting civilian causalities. The current inventory of precision weapons and networks that coordinate targeting adversaries with joint fires are too complex and costly to support smaller, distributed teams working beside local partners. Finding the right mix of forces and command echelon for these distributed operations requires experimenting with new organizations, a point highlighted by Lynch.

If small teams employing joint fires and effects in support of local partners is an optimal way to close with the enemy, the question remains how to sustain these distributed operations. Sustaining small teams requires a commitment to unmanned logistics and shifting from the iron mountain (i.e., large distribution area) to small drone delivery packages. Gerbacht in particular highlights the utility of unmanned aerial resupply systems like KMAX as a viable option.

Looking across the chapters at maneuver, fires, intelligence, sustainment, and command and control recommendations highlights the growing importance of unmanned systems tailored to create multidomain overmatch at lower echelons. The chapters show the importance of fielding cheap, flexible unmanned intelligence and attack assets. To operate in the complex terrain of the city, the U.S. military should accelerate its adoption of robotics to reduce risk and expand area coverage. UAS, to include microvehicles, should be accessible for ISR, logistics, and attack missions at every echelon. These systems enhance a Coalition's capability to identify and isolate the adversary (i.e., predators) without disrupting the population (i.e., prey). These systems should be cheap and flexible, allowing units to modify them for mission specific profiles.

When decisive action is required, opt for limited objective shaping raids and reconnaissance pull. That is, pulse the system to determine tendency and potential before committing to larger operations. In this, if larger enemy forces do reveal themselves, counter enemy mass by being able to counteract them in multiple domains (i.e., air, ground, information) at lower echelons (i.e., mini-MAGTF with robotics). This requires that lower-level units engage in dynamic targeting and leverage joint fires in support of local partners, replicating F3EAD (find, fix, finish, exploit, analyze, and disseminate) in conventional formations.

These recommendations produce the following requirements for U.S. military and/or other actors in the broader U.S. national security enterprise:

- Organization
  - Dedicate force structure to an experimental unit focused on operating in complex urban terrain and megacities; this unit would coordinate with rapid capability offices to address tactical challenges associated with communicating in the city, sustaining operations, and dealing with the persistent challenge of superstructures (i.e., maneuvering in high-rise buildings) and tunnels.
- Training and Education
  - Create live/virtual training environments that replicate maneuvering in complex terrain and influencing competing networks in a modern city; these training environments need to replicate population sentiment, connectivity, and the various friendly, neutral, and enemy actors to capture the emergent city system.
  - Implement the 100-battle rule (for each actual battle you fight, practice 100 times); create a stable, unclassified wargaming platform that allows military professionals to experiment with different maneuver approaches in complex urban terrain defined by competing influence networks, while replicating critical staff processes (e.g., IP over ethernet, sustainment planning, IO planning).
  - Develop digital case studies on recent urban campaigns

accessible in educational settings and for unit-level forums; these case studies should include U.S. as well as non-U.S. military and nonmilitary operations.

- Materiel
  - Increase investment in small, multimission unmanned platforms (e.g., ISR, strike, logistics) as well as the command architecture and airspace deconfliction required to operate them in large numbers (i.e., a swarm) at lower echelons.
  - Invest in capabilities to identify and map subterranean structures; similar to the multimission unmanned platforms, this should include strike packages to limit the risk to manned forces operating underground.
  - Create capabilities that help small units connect to local partners and push as well pull intelligence for targeting joint effects.
  - Implement advise and assist packages that allow local partners to generate effects at a higher rate (i.e., intelligence, fires, sustainment); these packages could be built from legacy equipment enhanced with new software packages that convert old equipment into unmanned platforms.

While not a panacea, the U.S. military and broader national security community requires new concepts and capabilities to operate in the complex terrain of the modern city. The main effort is defining the networks in the operational environment that highlight the larger territoriality of grievance adversaries leveraged to challenge U.S. interests. Once we understand the system, we can identify the best indirect approaches to isolate adversaries and create the conditions for local partners to solve local problems with minimal U.S. assistance. When the U.S. military goes on the attack in the future city, its existing conventional organizations lack the ability to integrate with Coalition and interagency partners, much less employ new swarms of unmanned vehicles that target an adversary's critical vulnerabilities (i.e., points of manipulation).

These chapters highlight the importance of prevention. In the new national security environment, most U.S. forces will be employed

in the contact layer. They will employ cooperation and competition mechanisms designed to advance U.S. interests globally. These forces should be able to support broader interagency and multinational crisis prevention activities before the United States has to commit ground forces to pursue elusive goals in costly campaigns. These chapters show that the modern city will be the key terrain of the future. Failing to prepare for operations in that complex terrain is an abdication of professional responsibility.

APPENDIX

The World's Largest Megacities

The concept of a megacity as previously defined becomes more complex as the fabric of nations adapt to changing circumstances. According to the definition offered by the United Nations, a city with more than 10 million inhabitants is defined as a megacity. Elsewhere, however, the threshold has been made broader at between 5 and 8 million. To further complicate the issue, a city can be confused with a metropolitan area. For example, the area known as "Metro Manila" in the Philippines has about 13 million inhabitants and is often referred to as a megacity. In actuality, the capital city of Manila has less than 2 million inhabitants.

Normally, cities grow and shrink through natural urbanization as populations leave rural areas for the opportunities (e.g., employment, services, education, etc.) represented by the urban environment. But often, especially in countries such as China, political decisions are used to combine one or more existing cities that previously coexisted separately. Based on the newly formed common municipal law structure with unified administration, this indeed is a single city.

Governments and politics in the larger urban construct are not comparable with those of a small rural area. But the duties and responsibilities of these massive cities are also immense as seen by the discussion in the chapters above, where infrastructure and environment top of the list of problems found in each megacity and may serve as the tipping point for potential violence and war. For the purposes

of this discussion, *governance* refers to "the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored, and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them."[1] The Worldwide Governance Indicators project reports aggregate and individual governance indicators for more than 200 countries and territories during 1996–2017 for six dimensions of governance and, for the purposes of our discussion, can contribute to the outbreak of urban warfare in a region:

- Voice and accountability;
- Political stability and absence of violence;
- Government effectiveness;
- Regulatory quality;
- Rule of law; and
- Control of corruption.[2]

Other characteristics of a country that may impact regional safety include religion, employment, economy, land use, and transportation, among many others. The following list shows the 20 largest cities (megacities) by population for 2017–18, not summarized metropolitan areas or districts.[3] Table 1 shows the data for individual criteria that may have contributed to or may contribute to violence in the region and the need for military intervention.[4] By way of comparison, each megacity's Worldwide Governance Indicators will be compared with those of the United States and the country listed by the 2018 Global Peace Index as the most peaceful region based on indicators for soci-

[1] Daniel Kaufman et al., "Worldwide Governance Indicators," World Bank, 2017.
[2] Corruption data came from the "Corruption Perceptions Index," WorldData and Transparency International, 2017.
[3] A nation's presence on this list of megacities does not indicate that violence or warfare in the area is a given, but merely highlights how large the country's cities are and how that population mass might impact peace at some point.
[4] The data provided here was compiled based on statistics reported by WorldData in 2017–18.

etal safety and security, extent of ongoing domestic and international conflict, and degree of militarization—Iceland.[5]

MEGACITIES

1. Shanghai, China, East Asia
   Population: 24,152,700 (1,386,395,000 country)
2. Beijing, China, East Asia
   Population: 21,700,000 (1,386,395,000 country)
3. Istanbul, Turkey, Western Asia/Southeast Europe
   Population: 15,029,200 (80,745,000 country)
4. Dhaka, Bangladesh, South Asia
   Population: 15,029,200 (164,670,000 country)
5. Lagos, Nigeria, Western Africa
   Population: 14,234,000 (190,886,000 country)
6. Moscow, Russia, Eastern Europe
   Population: 13,197,600 (144,495,000 country)
7. Karachi, Pakistan, South Asia
   Population: 13,052,000 (197,016,000 country)
8. Tianjin, China, East Asia
   Population: 12,784,000 (1,386,395,000 country)
9. Mumbai, India, South Asia
   Population: 12,442,400 (1,339,180,000 country)
10. São Paulo, Brazil, South America
    Population: 12,038,200 (209,288,000 country)
11. Shenzen, China, East Asia
    Population: 11,908,4000 (1,386,395,000 country)
12. Delhi, India, South Asia
    Population: 11,034,600 (1,339,180,000 country)
13. Lima, Peru, South America
    Population: 10,852,200 (32,165,000 country)

[5] For more information on this index, see *Global Peace Index, 2018: Measuring Peace in a Complex World* (Sidney, Australia: Institute for Economics & Peace, 2018). For 2018, the United States dropped seven spots to 121, well behind Cuba (81) and China (114) and a much closer to the least peaceful country in the world, Syria (163). The top 10 most peaceful countries beginning with first: Iceland, New Zealand, Austria, Portugal, Denmark, Canada, Czech Republic, Singapore, Japan, and Ireland.

14. Guangzhou, China, East Asia
    Population: 10,641,400 (1,386,395,000 country)
15. Seoul, South Korea, East Asia
    Population: 10,290,000 (51,466,000 country)
16. Kinshasa, Democratic Republic of the Congo, Central Africa
    Population: 10,125,000 (81,340,000 country)
17. Lahore, Pakistan, South Asia
    Population: 10,052,000 (197,016,000 country)
18. Jakarta, Indonesia, Southeast Asia
    Population: 10,042,200 (263,991,000 country)
19. Tokyo, Japan, East Asia
    Population: 9,508,800 (126,786,000 country)
20. Cairo, Egypt, Northern Africa
    Population: 9,500,000 (97,553,000 country)

Table 1 Countries with the top megacities and their percentile rank for Worldwide Governance Indicators, 2017–18.

Country with megacities	Control of corruption	Government effectiveness	Political stability and absence of violence/terrorism	Regulatory quality	Rule of law	Voice and accountability
			Percentile rank			
Iceland	**93.269**	**91.346**	**96.667**	**90.385**	**90.865**	**94.089**
United States	**88.942**	**92.788**	**59.048**	**92.788**	**91.827**	**82.266**
Bangladesh	19.231	22.115	10.476	20.673	28.365	30.049
Brazil	36.058	41.827	31.429	51.442	43.75	61.576
China	46.635	68.269	36.667	48.558	44.712	7.882
Congo, Dem. Rep.	5.769	4.808	3.810	5.288	3.846	8.867
Egypt, Arab Rep.	34.135	29.327	9.048	17.308	32.692	13.300
India	48.558	56.731	17.143	42.308	52.885	60.099
Indonesia	48.077	54.808	29.048	51.923	40.865	50.739
Japan	90.385	93.269	89.048	89.904	89.904	80.296
Korea, Rep.	67.788	82.212	58.571	82.212	85.577	71.429
Nigeria	12.5	16.346	5.238	16.827	18.75	34.975
Pakistan	22.596	31.25	1.905	29.327	24.038	28.079
Peru	38.942	48.558	36.190	67.308	33.173	55.172
Russian Federation	17.308	50.481	21.429	32.692	22.115	18.719
Turkey	49.519	55.288	7.143	57.212	45.192	27.586

Source: Worldwide Governance Indicators, last updated 4 October 2018

Glossary of Select Terms, Abbreviations, and Acronyms

Black market economy	An environment made up of criminal organizations that use a legitimate network to "clean" their money
Black swan	An event that comes as a surprise, achieves a significant effect, and may be inappropriately rationalized after the fact
C2	Command and control is the authority a commander has over forces to accomplish a mission
C4ISR	Command, control, computer, communication, intelligence, surveillance, and reconnaissance activities
COG	center of gravity, a theory developed by Clausewitz in On War that refers to a source of power that provides moral or physical strength, freedom of action, or will to act
Collective violence	Situational, organized, or institutional violence by a group of similar persons.
Connectors	An element that establishes a relationship between two or more nodes
Cyber levée en masse	A mass networked mobilization that emerges from cyberspace with a direct impact on physical reality
Cybersecurity	Defensive cyberspace operations
Dense urban terrain	Urban areas with population densities that exceed the government's ability to exert control
DO	Distributed operations or a form of maneuver using small teams across a large area through separate but coordinated actions

DUT	Dense urban terrain, a subset of MOUT, or military operations in urban terrain
FARC	Fuerzas Armadas Revolucionarias de Colombia, Colombia's largest guerrilla movement
Federally Administered Tribal Areas	A tribal area in northwestern Pakistan that includes seven tribal agencies and six frontier regions
Fires	Using weapons systems to create lethal and nonlethal effects on a target
Force protection	Preventative measures by a force to mitigate hostile acts
ECO	Enhanced company operations, or reorganizing and augmenting a traditional rifle company to contribute to "enhanced" command and control, intelligence, logistics, and fires capabilities
Ethnic militancy	Any nonstate belligerent (actor) systematically fighting based on ethnonationalism to defend and project the interests of an ethnic nationality
GCC	Geographic combatant commander
Global commons	Resource area that do not fall under the purview of any singular country, and all countries have access to them: high seas, the atmosphere, Antarctica, and outer space
Global domains	Land, sea, air, space, and cyberspace
Global South	The Third World
Governance	The traditions and institutions that hold authority in a country
Fog of war	An uncertain situational awareness during military operations
HUMINT	Human intelligence, or information covertly gathered to aid an operation
IO	Information operations, or the use of information, such as human networks, groups, and subgroups with religious, political, or cultural ties, to degrade an adversaries' ability to act
ISIL	Islamic State of Iraq and the Levant
ISR	Intelligence, surveillance, and reconnaissance, or a wide variety of systems used to acquire and process information
JAM	Jaysh al-Mahdi, or a militant force created by Shia cleric Muqtada al-Sadr
JTF-LA	Joint Task Force Los Angeles

Lashkar-e-Taiba	Largest and most active terrorist organization in Pakistan
MAGTF	Marine Air-Ground Task Force
Maneuver space	The freedom to advance toward a desired space
Maneuver warfare	Employing forces in combination with fires to achieve a position of advantage
Megacity	A city with a population of 10 million or more
MEU	Marine Expeditionary Unit
MNLA	National Movement for the Liberation of Azawad, a Tuareg militant group that formed in October 2011 and is presently one of the two largest militias in Mali
Mohajir	Urdu-speaking Muslims
MOUT	Military operations in urban terrain
MQM	Muttahida Qaumi Movement or United National Movement
Multidomain combined arms	Applying traditional fires with information operations across all domains (sea, land, air, space, and information)
Netizen	Those who actively participate in the online community
Network	The structure created by several nodes and connectors
Nodes	The intersection of networks created by a person, organization, or ideology
OODA loop	observe-orient-decide-act, strategy created by Air Force Colonel John Boyd to better understand human reaction time
Periurban	an area surrounding a metropolitan city that is neither rural nor urban
PMESII	Features of an urban environment's population or political, military, economic, social, information, and infrastructure
Predictive policing	Gathering data from a variety of sources for analysis
SIGINT	Signals intelligence, gathering information by intercepting signals, such as communication, radar, and weapons systems
SWEAT-MSO	Features of an urban environment's infrastructure, or sewage, water, electricity, academics, trash, medical, safety, and other considerations
SWOC	Symbiotic warfare operating concept

Symbiotic warfare	To control resources without disrupting the daily routine of a community
Transient mass	The ability of a city system to block or contain friendly forces using organize groups or devices on short notice
TTP	Tactics, techniques, and procedures Tehrik-e-Taliban is one of the largest militant organizations along the Afghan border
UAS	Unmanned aerial systems
Urbanization	A population shift from rural to urban areas
VOIP	Voice over internet protocol, allows the user to make voice calls using a broadband internet connection instead of a land line
YPG	Kurdish People's Protection Units, militia and the primary component of the Syrian Democratic Forces and defender of Kurdish-inhabited areas of northern Syria

Index

African Union (AU), 158, 163, 333
African Union Mission in Somalia (AMISOM), 163–65, 177
al-Assad, Bashar, 93, 212
Aleppo, Syria, 79, 81, 212
al-Maliki, Nouri, 77, 79–83, 92
al-Qaeda, 77
al-Sadr, Moqtada, 75, 79, 82, 86, 89, 148–49, 368. *See also* Jaysh al-Mahdi (JAM)
al-Shabaab, 163–65, 177. See also the Battle of Kismayo
al-Walid, Gen Khalid ibn, 222–23
aircraft
  AAI Corporation RQ–7B Shadow UASs (USA), 87
  Bell
    AH–1 Cobra, 285
    UH–1N Huey, 285
  Bell Boeing MV–22B Osprey, 285
  Boeing AH–64 Apache helicopter, 87
  General Atomics MQ–1 Predator (USAF), 87–88
  Lockheed Martin
    F–35 Lightning II, 284
    F–3B Joint Strike Fighter, 285
    Kaman K–MAX, 284–85
  McDonnell Douglas AV–8B Harrier II, 285
  Sikorsky CH–53E Super Stallion, 285
Annan, Kofi A., 333
Anonymous, 186, 200–2, 298. *See also* cartels
Arab Spring, 294–95, 298, 301, 303
Art of War, The, 200, 355. *See also* Tzu, Sun

Baghdad, Iraq, 75–83, 86n28, 87, 91, 107–8, 148, 299, 308, 320
battles
  Fallujah (First), 76, 145
  Fallujah (Second), 145–48
  Grozny, 76, 119, 121n28, 127–28
  Kismayo (First), 158, 163
  Kismayo (Second), 163–64
  Mosul, 354
  Sadr City, 6, 75–92, 148–49, 356
  Somme, xi, 227
behavior
  collective, 53–74, 235–36, 239, 367. *See also* Los Angeles and French riots
  institutional, 53n3, 55–56, 367
Beijing, China, 181, 291, 363

bin Laden, Osama, 328
Bonaparte, Napoleon, 182, 186–87, 205, 223
Boyd, Col John (USAF), 346, 369. *See also* OODA loop
Brazilian Army, 320, 339
British armed forces, xi, 19, 230, 271–76, 280, 282
  Royal Air Force (RAF), 269, 274–75, 277
  Army, 224–25, 228, 263, 289
  Navy, 270, 272, 278
Bush, George W., 78, 213

Cairo, Egypt, 301, 303, 364
Capstone Concept for Joint Operations: Joint Force 2020, 114, 131
cartels, 29–30, 292, 298–99, 302–3, 308
  Cali, 123
  Los Zetas, 297–98, 305
  Medellín, 111, 121–24. *See also* Escobar, Pablo
Castells, Manuel, 13, 16, 265, 295, 308
Central Intelligence Agency (CIA), 222, 231
Churchill, Winston, 273
City as a System Framework, 93–110, 141–44. *See also* Kilcullen, David
Clausewitz, Carl von, 9, 75–76, 273–74, 276, 322, 342, 353, 367
cognitive load, 204, 207–8, 210
collective violence, 53–57, 59, 61, 64–66, 67n40, 68–74, 367
Combined Joint Task Force–7 (CJTF–7), 145
command and control (C2), 46–47, 72, 137, 149, 169–70, 172, 178, 182, 193, 200, 205–8, 225–26, 259–61, 267, 304, 348, 357, 367–68
community policing, 40, 351
Conway, Gen James T., 45
Corbett, Julian S., 6–7, 77, 111, 116–17, 120, 127–28, 277
counterinsurgency (COIN), 8, 30, 39, 45, 50, 90, 117, 144, 159, 167, 254, 257, 293, 307–8, 347. *See also* Kilcullen, David
criminal organization or gangs, 13, 15–16, 21, 23, 41, 43–44, 64, 297, 299, 311, 367
cyberspace, 8, 169, 181–211, 293, 298, 300, 302, 304–6, 354, 367–68

Daesh, xiii, 347, 351, 354, 356. *See also* Islamic State of Iraq and the Levant
Deception, 137, 213, 218–20, 222, 224–26, 228–33, 260, 355
Deir Ezzor oil fields, 108
Delhi, India, 29, 363
Denny, Reginald, 68. *See also* Los Angeles riots; King, Rodney
dense urban terrain (DUT), xii, 3, 9, 12, 43–44, 140, 144–45, 150, 154–55, 264, 266, 281–83, 287, 289–90, 344–45, 348–49, 357, 367, 368
Department of Defense (DOD), 46, 73, 114–15, 133, 155, 222, 254, 308, 345
Department of State, 118, 127, 151, 302, 304
dePuy, Gen William E. (USA), 230
Dhaka, Bangladesh, 341, 363
distributed influence, 7–9, 111–39, 357
Dudayev, Dzhokhar, 120, 122, 125. *See also* Battle of Grozny

Edhi Foundation, 15
environmental centers of gravity (E–COGs), 94–97, 103
Escobar, Pablo, 111, 121–22, 124–25, 128
Expeditionary Force 21, 71, 74, 283

Fallujah, Iraq, xii–xiii, 76–77, 91, 144–48, 166, 215

favelas, xiv, 177, 215–17
feedback (reinforcing) loop, 97, 307, 310, 345, 350–51, 355
Fil, MajGen Joseph F., 78
FireChat, 194, 199–200
fog of war, 181–211, 368
force protection, 50, 72, 138, 152, 168, 175–76, 206, 208–9, 292, 349, 368
French
  Army, 67, 156–58, 173, 175, 178, 223–27. *See also* Operation Serval
  Police, 67
Fuerzas Armadas Revolucionarias de Colombia (FARC), 122–23, 368

geographic combatant commander (GCC), 47, 177–79, 368
Global Peace Index, 362–63
Global South, 314, 328, 334, 336, 340–43, 368
Goulding, Col Vincent J., 133
Great Firewall, 198, 200
grievances, 4, 30, 39, 52–55, 59–63, 66, 68–74, 347–48, 352
Grozny, Chechnya, xiii, 76–77, 90–91, 111, 119–31, 320
Guangzhou, China, 364

Hammond, MajGen Jeffrey W., 80, 83, 85–86, 89, 148, 150
Hart, Sir Basil Liddell, 271, 354
Her Majesty's Ship (HMS)
  Hermes (95), 272
  Prince of Wales (53), 272–75
  Repulse (1916), 272–75
Hong Kong, 181, 186, 189–203, 291, 294, 308
Hort, Col John H. (USA), 83, 85 85n25, 86–88, 92
hot spots policing, 40, 48–49, 351–52
human intelligence (HUMINT), 35, 38, 48, 79, 149, 160–61, 175, 368
humanitarian assistance and disaster response (HADR), 131, 184, 206, 232, 292, 296–97, 347
Hunter Warrior Advanced Warfighting Experiment, 286

Imperial Japanese
  Army, 269
  Navy, 274
information operations (IO), 89, 130, 136, 138, 145–46, 160–61, 166, 168, 171, 259–60, 291–93, 301–2, 304, 307, 358, 368–69
intelligence, surveillance, and reconnaissance (ISR), 35, 38, 50–51, 84, 87–88, 90, 92, 161, 171–73, 179, 184, 199, 203, 267, 280, 357–59, 367–68
international humanitarian law (IHL), 313
International Zone (a.k.a. Green Zone), 81–83, 86, 91, 148
Interorganizational Cooperation, 153–55
intraspecific competition, 243, 246–48, 250
invasion behavior, 244–47
Iranian "Green" Movement, 294, 298, 301, 303
Iraq Train and Equip Fund (ITEF), 152
Iraqi
  Air Force, 151
  Army, 80, 83, 89–90, 151
    44th Brigade, 90
Iraqi Federal Police (IFP), 151
Iraqi security forces (ISF), 78, 80, 84–86, 98–102, 104–5, 145, 148–51
Iraqi SOF Counter–Terrorism Service, 151
irregular warfare, 4, 255–56, 261
Islamic State of Iraq and the Levant (ISIL), xiii, 93, 94n1, 297, 347, 351, 354
Israel Defense Forces (IDF), 158–63, 169, 175, 228

Israel–Hezbollah War, 158–63
Israeli Air Force (IAF), 158, 162–63
Istanbul, Turkey, 363

Jabhat al-Nusra (al-Nusra Front), 108
Jakarta, Indonesia, 364
Jaysh al-Mahdi (JAM), 75, 77, 79–92, 148–50
Joint combined arms maneuver (JCAM), 156–80, 356
Joint Task Force Los Angeles (JTF–LA), 67. *See also* Los Angeles riots
Joint Urban Operations (JP 3-06), 96n4, 116–17, 166, 255–56, 260, 267

Kabul, Afghanistan, 20
Karachi Metropolitan Police (KMP), 32, 34–39
Karachi, Pakistan, 11, 14–29, 30, 32–39, 45, 178, 184, 363
Kilcullen, David, 4, 8, 13–16, 20, 48, 117–18, 176, 187–90, 214, 216, 239, 239n18, 240, 241n24, 294, 344n1
Ki-moon, Ban, 333–34
King, Rodney, 59–60, 65, 68. *See also* Los Angeles riots
Kinshasa, Democratic Republic of the Congo, 364
Krulak, Gen Charles C., 315
Kurdish People's Protection Units (YPG), 102–3, 109
Kurdistan Regional Government (KRG), 151–52

Lagos, Nigeria, 27, 29, 32, 280, 341, 363
Lahore, Pakistan, 364
Lashkar-e-Taiba, 191, 195
law enforcement agencies (LEAs), 17, 21–22, 25–28, 35, 38, 43
Lima, Peru, 363
Lines of communication (LOCs), 6, 73, 95, 97–98, 100, 106, 116, 120–21, 128, 165, 260, 278, 351
Los Angeles, CA, riots (1992), 54, 55n7, 58–59, 61, 64–69
Los Angeles Police Department (LAPD), 40–41,60, 64, 66–67, 69
Luck, Gen Gary E. (USA), 118

Mack, LtCol Richard E. (USA), 232
MAGTF Cyberspace and Electronic Warfare Coordination Cell (CEW-CC), 208
Mahan, Alfred T., 6–7, 111, 116–17, 120, 127–28
Mahdi Army, 75. *See also* Battle of Sadr City
Malay Peninsula, 263, 269–78
Mali, Republic of, 158, 166, 173–78, 320. *See also* Operation Serval
Map Kibera project, 296
Marine Aviation Weapons and Tactics Squadron 1 (MAWTS-1) Night Vision Device (NVD) Manual, 268
Marine Corps Planning Process (MCWP 5-10), 143
Marine Corps Warfighting Laboratory, 45, 133, 286
Marx, Karl, 143
Medellín, Colombia, 111, 119–29
Megacity, The: Operational Challenges for Force 2025 and Beyond, 204
Mexico City, Mexico, 29, 32
micro air vehicles (MAV), 259–60, 280, 283, 287, 289
military operations in urban terrain (MOUT), 254, 312, 314, 322, 343
Military Operations on Urbanized Terrain (MOUT) (MCWP 3-53.3), 255
Mohajir, 19–20, 23
Mogadishu, Somalia, 157n2, 315, 330
Moscow, Russia, 120–21, 363

Mosul, Iraq, xiii, 93–110, 140, 144, 150–54, 212, 297, 348, 354
MTTP for Aviation Urban Operations (MCRP 3-35.3A), 267
Multinational Corps-Iraq (MNC-I), 86–87
Multinational Division-Baghdad (MND-B), 78, 80, 83–84, 87, 89
Multi-Service Tactics, Techniques, and Procedures Manual (FM 6-03.05), 154
Mumbai, India, 27, 29–30, 32, 37, 41, 178, 188–202, 241n24, 363
Muttahida Qaumi Movement (MQM), 16–17, 20, 24–25

National Gang Report (2011, 2013), 187
National Movement for the Liberation of Azawad (MNLA), 178
National Security Strategy (NSS), 111
Neighborhood Watch, 40
network influence and protection boards (NIPBs), 304–6, 308
New Orleans Police Department, 39–40
New York Police Department (NYPD), 37–38
nongovernmental organizations (NGOs), 12, 14, 16, 18, 21, 32, 49, 114–15, 151, 155, 303–6, 309
nonstate armed groups (NSAG), 240, 292, 297–300, 302–5, 307–9
North Atlantic Treaty Organization (NATO), 314, 319, 333, 335
notional operation plan phases, 47

Occupy Central, 291
Occupy Sandy, 296
Occupy Wall Street, 69
On War, 276. *See also* Clausewitz, Carl von
OODA loop, 209
Operational Terms and Graphics (FM 101-5-1), 221
Operations
  Clean Up, 17, 23
  Desert Storm, 144
  Enduring Freedom (OEF), 144, 155
  Enforcing the Law, 78–79
  Gold Wall II, 84–86
  Inherent Resolve, 150–51
  Iraqi Freedom (OIF), 86, 89, 144, 150–53, 155
  Matador, 273–74, 276–77
  Overlord, 231
  Phantom Fury, 145–46
  Serval, 173–78
  Striker Denial, 84, 86
  Vigilant Resolve, 145
Out of the Mountains, 117, 188, 190, 214. See Kilcullen, David

Pakistan, 11, 14–15, 19–22, 24–26, 32, 35–36, 38, 184, 190, 193–94, 197, 199, 201, 203, 328, 363–65
  Army, 17, 23–29, 34, 38, 42, 45
  Police, 32–35
Paris riots (2005–6), 54, 59–68
Pearl Harbor, HI, 269, 274
Percival, LtGen Arthur E. (Britain), 263, 271
persistent aviation support (PAS), 171–73, 179
Peshawar, Pakistan, 20
Police Act (1861), 32
policing, 5–6, 25, 27, 29–46, 48–49, 51, 71, 241, 313–14, 317–20, 329, 331–32, 337–43, 351
Port-au-Prince, Haiti, 311, 315, 339–40
Pottery Barn Rule, 213, 229, 232–33
Powell, Gen Colin L. (USA), 213
predator/prey models, 248–53
predictive policing, 39–41

Principles of War, 75–76. *See also* Clausewitz, Carl von

Qahafa, Abu, 199

Ras Kamboni, 163–65, 177
remotely piloted vehicles (RPV), 280, 283
Revision of World Urbanization Prospects, 2018 (WUP), 264
Rio de Janeiro, Brazil, xiv, 177, 215, 320
rules of engagement (ROE), 116, 333, 347
Russia, 6, 20n21, 21, 76, 90–91, 111, 119–21, 122n34, 123–25, 127–29, 131–32, 212, 223, 297, 320, 363, 365
  Army
    131st Brigade, 126
    Eastern Group, 126
    Northern Group, 126
    Western Group, 126
Russian election hacking (2016), 347

Sadrist Movement, 79, 82, 84
São Paulo, Brazil, 363
Scholarism, 291
Seoul, South Korea, 189, 364
Shah, Zarrar, 193
Shanghai, China, 363
Shenzen, China, 363
signal intelligence (SIGINT), 160, 175
Sindh Police, 26–27, 34, 36, 38
Somali National Army (SNA), 163–65
Some Principles of Maritime Strategy, 77. *See also* Corbett, Julian S.
South Lebanon Army (SLA), 163
Special Operations Forces (SOF), 28, 44, 47, 50, 80, 86, 90, 149–55, 171–74, 179, 259
symbiotic warfare, 8, 234–62, 355
Syria, xiii, 86, 93, 94n1, 95, 98–109, 140, 150, 212, 363n5

Talley, BGen Jeffrey W., 89
Tehrik-e-Taliban Pakistan (TTP), 25–27
Three Block Warfare, 315. *See also* Krulak, Gen Charles C.
Tianjin, China, 363
Tokyo, Japan, 364
transient mass, 53–54, 57, 59–61, 64–66, 69, 182–83, 189, 192, 194, 197, 201–8, 201–11, 347
Tzu, Sun, 8, 41, 170, 210–11, 213, 229, 232, 275–76, 345, 346n4, 354–55

United Nations (UN), 39, 156–57, 183, 217, 264, 311, 333, 361
UN Population Fund, 217
UN Stabilization Mission in Haiti (MINUSTAH), 311, 339–40
unmanned aircraft systems (UAS), 87–88, 92, 160–61, 169, 171–72, 209, 269, 179–80, 283, 357
Urban Operations (FM 3-06), 96n4, 116–17, 157, 166, 255–56
U.S. Agency for International Development (USAID), 47, 151, 153, 304, 306
U.S. Air Force, 77, 87, 151, 331
  Research Laboratory, 288
U.S. Army, 86–87, 112–13, 117, 150, 157, 166, 175, 177, 212
  2d Stryker Cavalry Regiment, 81, 84–85
    1st Squadron, 81, 84–85, 85n25
  4th Infantry Division, 77, 80, 83–85, 87–88, 92
    3d Brigade Combat Team, 83–88, 92
  17th Infantry Division, 100
  68th Armored Regiment, 84
    1st Combined Arms Battalion, 84
  82d Airborne Division, 151

93d Brigade, 100
101st Airborne Division, 151
Special Operations Command, 133
U.S. Army Operating Concept (TRADOC Pamphlet 525-3-1), 74, 139n64, 157, 166–67, 169, 171, 177
U.S. Marine Corps, 4, 71, 132–33, 143, 145, 203, 208, 254–55, 263–70, 179–86, 288, 290, 318, 346, 351n11
3d Marine Expeditionary Brigade (3d MEB), 206
3d Marine Division, 204
I Marine Expeditionary Force (I MEF), 145
Marine Air-Ground Task Force (MAGTF), 28, 206, 208–9, 284–86, 358
Marine Corps Aviation, 263–69, 279–81, 284, 289–90
Marine Expeditionary Unit (MEU), 47, 285
Special Purpose MAGTF-Crisis Response, 206

virtual resistance networks (VRN), 8, 291–310
voice over internet protocol (VOIP), 190n31, 193, 195, 199, 201

Warfighting (MCDP 1-0), 132, 269, 346
War on Drugs, 126
World Health Organization (WHO), 264
Worldwide Governance Indicators, 362, 365

Yeltsin, Boris, 124